

COMPUTERWORLD

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NEWSPAPER



Wide World Photo

What Would Babe Think?

*Take me out to the ballgame,
Take me out to the park,
Homeruns and flyballs will fill the air,
We won't see the players, because
they're not there.*

*You can root, root, root for the home
team —*

*If they don't win, it's a glitch;
It's still one, two, three strikes you're out
When the CPU calls the pitch.*

By Tim Scannell
CW Staff

BOSTON — With out-of-the-park homeruns, triple plays and even an occasional player sent to the showers, it sure sounds like baseball. But in this case, at least, the grassy playing fields are really card tables and

(Continued on Page 8)

U.S. vs. AT&T Resumes Today

By Phil Hirsch

CW Washington Bureau

WASHINGTON, D.C. — The bottom half of the ninth inning begins here today in U.S. vs. AT&T, the government's massive antitrust suit against the Bell System.

AT&T opens its defense this morning and is expected to present 340 to 350 witnesses over the next few months. Their testimony is expected to be completed by Dec. 1. The Justice Department may present rebuttal witnesses afterwards, and at the end of their testimony, both sides probably will submit statements of proposed findings to presiding Judge Harold H. Greene.

Earlier, the Justice Department put 93 witnesses on the stand during an

(Continued on Page 2)

IBM to Support X.25, X.21 in U.S.

By Bruce Hoard
CW Staff

WHITE PLAINS, N.Y. — IBM ended years of speculation last week when it gave users of its Systems Network Architecture (SNA) X.25 and X.21 gateways to public data networks.

The hardware and software is said to enable IBM customers to use packet-switched, circuit-switched and leased-circuit services of the public data networks along with conventional telecommunications services in the operation of their SNA networks.

Recommendation X.25 as promulgated by the Consultative Committee for International Telephone and Telegraph (CCITT) defines three levels of protocols and lays down guidelines governing packet-switched network services.

Recommendation X.21 defines an interface between processors or terminals and public data networks offering leased circuit and circuit switching services. It is also the first level of the physical interface preferred by the CCITT for X.25 packet-switched services.

The products are said to be compatible with the Telenet and Tymnet public packet-switched networks.

The IBM X.25 Network Control

Program (NCP) Packet Switching Interface software runs in the IBM Models 3705-II and 3705-80 communications controllers and gives users the basic ability to send and receive data over the public data networks.

The software works with the vendor's network control programming, providing transmission control, data formatting, error recording, testing and other high-level functions that allow the 3705 to communicate with a variety of SNA terminals and distributed processors using packet-switched networks.

It also permits data to be transmitted via packet-switched networks to non-SNA terminals having the necessary facilities to transmit or receive data through X.25-based networks.

The NCP Packet Switching Interface will be made available in three releases over the next year. The first release establishes the basic link to the public data networks and features a maximum packet length of 4,092 characters. It will be available in the third quarter of this year.

It contains "Modulo 8" packet selection

(Continued on Page 6)

DP Shortage Hits Hardest In Metropolitan Locations

By Brad Schultz

CW New York Bureau

NEW YORK — Shortages of DP professionals afflict metropolitan areas more uniformly than small towns in the U.S., according to a telephone survey of DP managers Computerworld conducted last week.

Around big cities, DP managers typically have trouble recruiting qualified professionals and have to deal with high staff turnover rates because available DPs can choose

from many employers.

However, outside urban sprawls, the situation varies. DP managers have difficulty attracting computing specialists to some small towns. But DP managers in many small towns find enough specialists who wish to avoid big city life.

When DP positions fall vacant at Consolidated Cigar Co. in New York, DP manager Michael Lentini interviews until "blue in the face" to find a qualified applicant. These interview cycles "rob me of time I need to manage effectively," Lentini told CW.

Qualified DPs are also hard to come by in Chicago, according to Edward Modla, management information systems director at Allied Products Corp. Modla's approach is to hire inexperienced people and train them in-house for computing jobs.

On the edge of greater Los Angeles, DP director Phil Lucien wrestles with a 45% annual staff turnover rate at Purex Industries, Inc. in Lake-wood, Calif.

(Continued on Page 4)

IBM Datamaster Joins Ranks Of Small Business Systems

By Tom Henkel

CW Staff

ATLANTA — IBM has joined the ranks of small business system vendors by announcing the System/23 Datamaster, a data processing and word processing system that aims at the \$10,000 to \$15,000 market and will be sold through IBM's retail outlets.

Along with the announcement, IBM cut the production status of its 5120 desktop processor from "new" to "not new," in essence killing that processor as a member of IBM's active product lineup.

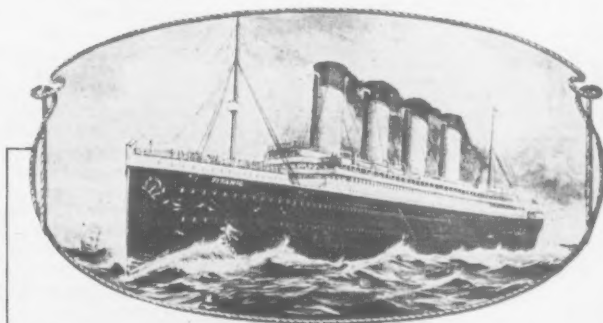
The workstation-based Datamaster comes with a minimum of 32K bytes of main memory, which is upgradeable in 32K-byte increments to a maximum configuration of 128K bytes. Up to two workstations can operate simultaneously, but industry analysts and observers believe IBM plans to expand that number to four.

The processor is programmed in business Basic and can make use of industry-standard Basic programs. In addition, IBM said Datamaster Basic programs are "highly compatible" with those on System/34, implying that an upgrade to the larger proces-

sor would be straightforward.

However, the firm made no mention of the RPG programming language, popular on System/34, System/3 and the top of the General Systems Division line, System/38. Analysts say IBM will probably offer RPG-II support as well as Basic.

(Continued on Page 4)



The search for the Titanic drew to an anticlimactic close last week. Explorers returned to port after 20 days at sea, during which they used the latest computer-assisted gear in an attempt to find the remains of the ill-fated passenger liner. See story on Page 15.



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U.S. to Quit AT&T Antitrust Suit?

WASHINGTON, D.C. — The government's antitrust suit against AT&T was on the verge of collapse last week, after the Reagan administration and the telephone company agreed on a quid pro quo — termination of the suit in exchange for tightening of a communications bill now pending in Congress.

But Judge Harold H. Greene, who is presiding over the antitrust case, denied a Justice Department motion for an 11-month delay in the trial, scheduled to resume today.

Greene acted after Assistant Attorney General William Baxter told him the administration has concluded there is no realistic possibility of enacting S. 898, the Communications Act rewrite bill recently approved by the Senate Commerce Committee,

"unless, in some sense, this case is put on ice."

If the legislation passes with the amendments that have been worked out, "it would be the administration's intention to discontinue the litigation," Baxter explained to Greene, adding that the amendments had been "checked" with AT&T.

According to one knowledgeable source, the government is now likely to go back to court and request dismissal of the case. A Justice Department spokesman said the government is free to withdraw its charges at any time, on a unilateral basis, without action by Greene. However, Sen. Strom Thurmond, chairman of the Senate Judiciary Committee, said his group would hold a hearing this week on the government's actions.

Under the agreement worked out by AT&T and government lawyers, the amount of "competitive" equipment Western Electric could sell to Bell operating companies would depend on how much it sold to non-Bell telephone companies and end users. One aim is to enlarge the market for independent suppliers within the Bell System. Another is to prevent unfair price competition. On that point, an AT&T spokesman said the prices charged non-Bell customers would "validate" the prices charged the operating companies.

Another Amendment

A Justice Department spokesman said the administration plans to support a second amendment to S. 898, aimed at giving the specialized carriers equal access with Long Lines to Bell's local-exchange networks. The AT&T spokesman, when asked to comment, said it was not a part of the agreement negotiated by Bell and Justice Department lawyers.

Both specialized carriers and independent terminal manufacturers will fight the government's proposed amendments vigorously, judging by what their spokesmen were saying here last week.

The terminal makers' primary concern is the alleged failure of S. 898 to separate the manufacturing and research and development of regulated and deregulated products, while the specialized carriers insist that local-exchange service must be separated from long-distance service to a far greater extent than is provided in the Senate bill.

"Assistant Attorney General Baxter is wrong and his rationale is specious," commented Rep. Tim Wirth, chairman of the House telecommunications subcommittee. Wirth's group will shortly begin drafting its own communications bill. Wirth added that the assistant attorney general "is aware that common carrier legislation is the top priority of my subcommittee."

AT&T Trial to Resume Today, Defense Witnesses to Take Stand

(Continued from Page 1)

18-week period in an attempt to prove that AT&T violated the Sherman Antitrust Act. Now it is the phone company's turn to defend itself against these charges.

According to one estimate, the proposed findings will be submitted late in December. That could enable Judge Greene to begin considering his verdict in early January. But because of a number of unknowns, it is impossible to be precise about the timetable.

Efforts are under way within the Reagan administration, for example, to withdraw the government's charges. The secretaries of Defense and Commerce — Casper Weinberger and Malcolm Baldrige, respectively — do not want AT&T forced to divest itself of Western Electric or the Bell operating companies.

Weinberger is worried that breakup of the Bell System would weaken national security while Baldrige fears that it would make U.S. telecom-

munications standards and products less acceptable in other countries and enable foreign manufacturers to increase their share of the domestic U.S. telecommunications market.

According to an ex-Justice Department attorney who has been closely following the case, "the government has shown that AT&T is guilty of unsavory, but not illegal, practices." To prove a violation of the Sherman Act, the government must, among other things, prove that the phone company has engaged in unlawful conduct that has the purpose and effect of maintaining a monopoly power.

While government witnesses have shown clearly how Bell operating companies fought to prevent interconnection of independently made terminal equipment in the years following the Federal Communications Commission's 1968 Carterfone Decision, they have failed to show that it was done purposely to help Western Electric maintain its dominant market position, the source said.

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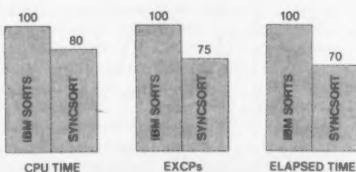
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Supervisors to Guide Planes if ATC Strike Hits

By Marguerite Zientara
CW Staff

WASHINGTON, D.C. — In the case of a threatened air traffic controllers (ATC) strike, supervisory personnel with rusty skills may be left to separate aircraft, according to a General Accounting Office (GAO) report released last week.

The threat of a crippling strike is once again abroad, following the overwhelming rejection last week of the tentative Federal Aviation Administration (FAA)/Professional Air Traffic Controllers Organization (Patco) contract. Controllers rejected the agreement by a vote of 13,495 to 616.

The GAO study confirms the results of an investigation by Rep. Bob Whittaker (R-Kan.) concerning staffing and training problems within the FAA. The study was requested last June by Whittaker and Sen. Charles Percy (R-Ill.).

According to the report, proficiency training problems exist at O'Hare International Airport — the world's busiest — O'Hare Center, Denver Airport and Denver Center, the four facilities studied.

"Although FAA regulations specify that supervisors at all FAA facilities must remain current in their ability to control air traffic, GAO found at three of the facilities the FAA had no method to ensure that the supervisors were remaining proficient in their ability to safely separate air traffic," Whittaker noted.

"This is a very important point because the FAA has said that in the event of a controllers strike, the supervisors would step in to control air traffic," he added.

In addition to the proficiency training problems at O'Hare, that airport

is also plagued by staffing shortages, the report found, although the other three sites had no staff shortages.

The GAO noted that the FAA admits the problems exist and will take action to resolve the deficiencies cited in the investigation. "In the fu-

ture," Whittaker said, "I will continue to monitor the progress of the FAA in dealing with the problems cited in the GAO report and also their plans for replacing the outdated IBM computers that are responsible for controlling air traffic."

IBM Joins Small Business System Mart

(Continued from Page 1)

The processor is reportedly based on Intel Corp.'s 8086 microprocessor (IBM refused to specify the model number, but it did confirm that the microprocessor is manufactured by Intel. Displaywriter uses the 8060, but IBM said the Datamaster microprocessor is not exactly the same).

It features single or dual integrated diskette drives capable of storing between 0.3M bytes and 2.2M bytes of information. An optional diskette unit is also available to provide a maximum storage of 4.4M bytes, IBM said. The processor comes with 112K bytes of read-only memory and has a main storage cycle time of 975 nsec. Also standard in the processor is storage parity checking, IBM said.

In addition to the Datamaster workstation, the 5322 in IBM's nomenclature, the firm also announced two printers: the 80 char./sec 5241 and the 160 char./sec 5242. An option to 5242 that offers a 40 char./sec letter-quality printing capability, called the 5242 Model 2, is also available, IBM said.

IBM also announced the 5246 diskette unit that contains up to two drives of up to 1.1M bytes of storage each. Models 021 and 022 can be attached to 5322 for file sharing. With the addition of the 5246 diskette unit, each 5322 can access up to 4.4M bytes of on-line storage. With two workstations and an additional 5246, total diskette memory can be increased to 6.6M bytes, according to IBM.

Software Debuts

Software announced with the system includes a line of accounting packages that IBM is collectively calling the Business Management Accounting System. Programs include billing, inventory accounting, accounts receivable, accounts payable, payroll and general ledger. The programs are menu-driven and users can automatically update information between application programs. Each program costs \$1,025, IBM said.

Also announced was Release III of the Business Reporting/Application Development System program product, which allows users to tailor Datamaster to specific needs.

A word processing option that reportedly uses the same software as Office Products Division's Displaywriter is also available on Datamaster.

Features include the ability to draw upon data processing files to print business letters for mass mailings to all customers or specific groups. Also

included are standard text-editing functions, IBM said. The word processing circuit card costs \$600 and the software costs \$500 for a combined price of \$1,100.

A base configuration of a 64K-byte single workstation with 2.2 bytes of diskette storage, an 80 char./sec printer, an integrated diskette controller and a diskette sort package costs \$9,830.

The same configuration with a 160 char./sec printer costs \$10,630 and a dual-workstation installation with an 80 char./sec printer, the 5246 diskette unit Model 022, a 3775 disk controller, the diskette sort package and a printer switch cable assembly costs \$19,090, IBM said.

In announcing Datamaster, IBM formally shut the door on its somewhat unsuccessful 5100 line of desktop processors. The production status of the 5120 was changed from "new" to "not new," meaning IBM no longer plans to actively market the processor. IBM made a similar move on the smaller 5110 when the 5120 was announced.

Datamaster also destroys what little market was left for the System/32, a batch-only system for small business-type applications, analysts said.

Delivery is immediate and IBM said it plans to market the Datamaster through all its General Service Division sales channels as well as its Office Products Division retail outlets in Baltimore, San Francisco and Philadelphia.

DP Shortage Hits Hardest in Cities

(Continued from Page 1)

To fill the 16 job slots under him, Lucien provides in-house training to promoted operations workers and has lowered the level of skills necessary for some DP functions by implementing high-level software.

In the nation's capital, DP director Ray H. Kunkle reported no great harm from DP shortages at The Washington Post Co. But he joined many survey respondents in asserting that people should have more "practical" experience in computing when they graduate from college and start DP careers.

Fresh from school, entry-level programmers tend to take unrealistic "textbook approaches" to DP, Kunkle maintained.

Computer science graduates generally lack sufficient awareness of the business world, agreed data systems manager Doug Callaway at Imperial Sugar Co., Sugar Land, Texas. Academic DP programs should be taught in business schools, according to Philip G. Andruss, DP director for the Shawnee County government in Topeka, Kan.

Olympia Brewing Co.'s Wendell Carlson, who serves on a community college advisory board, observed that


computer science departments turn out "mechanics" while DP departments turn out "race car drivers." By this analogy, computer science graduates have a deeper understanding of how systems work, how their design can be improved and what they may be like years from now.

In contrast, DP graduates are more adept at using systems to draw optimum performance out of available resources.

Trained as a systems engineer, Carlson, an information systems director, said he shared the mechanic's fascination with technology. But at Olympia Brewing, he prefers to hire race car drivers.

Carlson suggested that national statistics that show demand for DP professionals far outstripping supply do not describe the situation in Olympia and many other small towns. Job applicants at his company are drawn to the Pacific Northwest's physical beauty.

At Winnebago Industries, Inc. in Forest City, Iowa, DP manager Gary A. Heiser said applicants for positions on his staff seem to place a higher priority on life away from big city pressures than on career opportunities in computing.




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Exec Tells Congress

TDF Barriers Seen Hitting U.S. Firms in Pocket

By Jake Kirchner

CW Washington Bureau
WASHINGTON, D.C. — Erection of transborder data flow (TDF) barriers, a very real near-term threat to U.S. multinational companies, would directly translate into increased costs, a corporate telecommunications director told Congress recently.

"Any restrictions on transborder data flow for multinational corporations would mean we would lose economies of scale," according to Gaige Paulsen, corporate director of telecommunications at Motorola, Inc. "We would have to hire more people, duplicate hardware, software and facilities and change our planning as well as our management."

Dollar and Cents

While volumes have been written on the privacy concerns, political nitpickings and Third World interdependence leading, inevitably it seems, to data flow barriers, the dollar and cents aspects of the problem still are not clear.

To this point, Congress, after several year's hearings and study, has still not developed firm figures on the problem. And that situation will probably continue, at least for the short term, because countries are only now beginning to study the economic aspects of international communications and information issues.

However, the outlook for companies whose data processing and telecommunications operations might not be burdened by data flow barriers is easily and succinctly described, according to Paulsen: "In a nutshell, costs would increase."

Impact on Firms

Paulsen's comments came during hearings July 22 as the House telecommunications subcommittee, grappling with a long-term effort to deregulate the American communications industry, paused to consider the impact of its action on the international competitiveness of U.S. firms.

Because the U.S. economy is now "far more international in its makeup," Subcommittee Chairman Timothy Wirth (D-Colo.) said in an opening statement, the subcommittee must "ensure that any attempts we make to update our telecommunications laws and policies are based on a thorough understanding of the world in which we live."

It is equally important, he added, that "U.S. policy enhances the ability of firms to

compete overseas."

"We are all aware in some inchoate, cover story kind of way," Wirth continued, that the U.S. economy is moving into a services-based, information-dependent era. So it is necessary "to ensure [that] users of telecommunications products and services have access to the diversity of products and services they

require."

Paulsen, responding to that concern of the subcommittee, urged Congress to "exercise extreme caution in the formulation of policy." As described by the Motorola executive, the issue is sensitive and the stakes high.

"Our worldwide manufacturing and marketing activities have become extremely

dependent on our international communications system," he noted.

The company currently operates a worldwide data network using 26 international circuits, including satellite links, handling approximately 1.5 billion characters of data per day.

The network includes more than 4,000 interactive termi-

nals connecting U.S. installations with 20 major facilities overseas.

Without that access to information, Paulsen said, "the risk is that alternative management information systems, on other than a worldwide integrated basis, might be too costly and slow for us to remain competitive," Paulsen said.

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CW83



Study Cites 'Assaults' On SNA From Government, User Groups

By Bruce Hoard
CW Staff

FRAMINGHAM, Mass. — "IBM's System Network Architecture is being assaulted from all directions. Other vendors, user groups and the government all claim to have a better alternative."

Despite that assault, however, System Network Architecture's (SNA) niche in the battle for network architectural supremacy is secure.

That assessment of IBM's method of governing a distributed DP network is from a study entitled "SNA — State of the Market — 1981" released recently by International Data Corp.'s (IDC) Information Industry & Technology Service.

The report notes that 22% of IBM's domestic mainframe sites are operating under SNA, a percentage expected to reach 45% by the end of 1985. Turning to the future, IDC found 25% of the non-SNA users it contacted are considering converting to SNA within the next two years.

This evidence was gathered from published literature on SNA, a detailed survey of 200 sites using IBM 370X communications processors and a more in-depth survey of 50 SNA users.

Aspiring Contenders

There are several aspiring contenders for SNA's position of prominence, according to IDC. The International Standards Organization's Open Systems Interconnection (OSI) model represents work done since 1976 in the public and private sectors, with such companies as AT&T and IBM participating.

The OSI model is similar to SNA. SNA has been completely specified, but not entirely published. OSI has been fully published, but not fully specified.

What does that mean? "Thus it may be easier for some vendors of interconnecting or compatible equipment

to build to OSI standards rather than SNA," the study declared.

There is more SNA competition. Various vendors — including Digital Equipment Corp., Honeywell, Inc., Sperry Univac Corp. and Burroughs Corp. — are offering proprietary architectures for their large computers.

The study also features a management summary and sections on the evolution, basic concepts, details and future of SNA. The evolution section describes the pre-SNA environment, in which IBM had more than 200 different types of products installed, 35 teleprocessing access methods and 15 data link controls.

Under basic concepts, the study discusses "the hardware and software basics," including:

- An IBM S/370, 30 series, 3081 or 4300 host.

- An IBM 370X programmable communications controller running some release of Network Control Program (NCP).

- A proper version of an access method such as Virtual Telecommunications Access Method or Telecommunications Access Method.

- Synchronous Data Link Control (SDLC) and some type of SDLC-compatible terminals.

In the future, burgeoning communications and information needs should bode well for both SNA and its competitors, the report states.

Specifically, SNA will have to be "far more compatible. It will have to support X.25 and X.21 (another communications interface) or IBM will miss selling equipment and services to those users with packet data networks. X.25 is not going away and most industry experts agree that there will be considerable demand for hybrid networks of X.25 and SNA," the study said.

The 78-page study is available for \$995 from IDC's Information Industry & Technology Service at 5 Speen St., Framingham, Mass. 01701.

Are SNA Users Locked Into All-IBM Environment?

By Bruce Hoard
CW Staff

SAN JOSE, Calif. — Does IBM's System Network Architecture (SNA) lock users into an all-IBM environment? Does a conversion to an SNA environment isolate users from advances in data communications technology?

Those are some of the hard questions asked by "IBM's SNA: User Impact," a 160-page report produced by Communications Solutions, Inc. The report supplies an answer to the first question by pointing out that "as SNA has matured, IBM has adopted a strategy of providing network management and application software that spans various components of the network."

"For example, IBM's Distributed Office System consists of components that reside in the 8100 distrib-

uted processing systems as well as components that reside in the host." In addition to supporting the remote processes, the host components also provide interfaces to other IBM host software packages, it continued.

The upshot is IBM intends to continue offering users valuable functions such as distributed access to host data bases and compatible interfaces between various distributed software products.

This situation tends to lock users into an all-IBM or IBM-compatible network environment and could also make things difficult for independent vendors, which will be forced to duplicate interfaces to IBM host software.

The report is available for \$395 from Communications Solutions, Inc. at Suite 200, 4040 Moorpark Ave., San Jose, Calif. 95117.

IBM to Support X.25, X.21 in U.S.

(Continued from Page 1)

quence numbering, in which acknowledgment from the receiving node is required after the transmission of every eight packets from the originating node.

It also allows two 3705s to communicate where the first is attached to a primary network node and the second to a secondary network node.

Releases 2 and 3 are to be made available during the second quarter of next year. In Release 2, the Modulo 8 feature will be upgraded to handle 128 packets without acknowledgment, the vendor claimed.

It will also offer the ability to attach "teletype and stop and start" devices. Further, users will have an option of writing their own programs to control those devices.

Release 3 will be characterized by its ability to connect SNA network nodes through X.25-based networks.

The IBM Network Interface Adapter is a "hardware box" said to con-

vert SNA's Synchronous Data Link Control (SDLC) protocols to and from X.25 communications protocols. It permits a wide range of SNA terminals and IBM processors which do not use 3705s to communicate through X.25-based packet-switched networks.

Combined, the NCP packet-switching interface software and Network Interface Adapter hardware comprise the same package IBM has been supporting as a "black box" for X.25 connection in such countries as Canada, West Germany, France and The Netherlands.

X.21 on 3705s

IBM's X.21 switched and non-switched features will also be available on the 3705-II and 3705-80. Both will be supported by Advanced Communications Function programming. However, both the nonswitched and switched versions are being offered with a considerably lesser range of terminals and processors than the X.25 products.

The monthly license fee for the X.25 Network Control Program Packet Switching Interface is \$190. The Network Interface Adapter can be purchased for \$9,100, leased for \$270/mo under terms of a two-year agreement or rented for \$317/mo.

The purchase price for the X.21 features installed on 3705s ranges from \$1,550 to \$2,600. X.21 features may be leased for \$50- to \$85/mo under a two-year agreement or rented for \$59- to \$100/mo. On other devices, the purchase prices for X.21 features range from \$770 to \$945, or they can be leased for \$22- to \$27/mo under terms of a two-year agreement. The rental price is \$26- to \$32/mo.

Why did White Plains release its X.25 and X.21 products now? William R. Becklean, a vice-president at Kidder, Peabody & Co., feels IBM caved in to the clamor of customers.

"I think IBM has tried for a long time to ignore X.25," he commented. "I think a lot of people, IBM included, figured X.25 was not a good solution to the networking problem, but X.25 is gaining momentum because people are using it and want to keep using it. So I think IBM was really forced to support it," he said.

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Domestic X.25 Support Gives 3705s New Life

By Brad Schultz

CW New York Bureau

NEW YORK — IBM's release of domestic support for X.25 confirms a new lease on life for the 3705 communications processor family and a new direction for the Systems Network Architecture (SNA).

Many IBM watchers predicted last year that the 3705 family would retire this year. The family is about as old as commercial data communications itself, they explained, and IBM has stretched the basic 3705 design considerably over the years to accommodate software the vendor keeps adding to SNA.

IBM spokesmen gave strong hints in 1980 and recent months that domestic support for the X.25 communications protocol was inevitable. Some industry analysts speculated that a 3705 replacement series would be the vehicle for this support, which greatly eases use of public data networks by IBM customers.

But IBM has tied the X.25 support to "selected" 3705 models. The vendor may launch the long-awaited series of 3705 successors in coming months, augmenting the H series mainframes anticipated by many analysts. However, 3705s will not be phased out for some time if sense can be made of the three models — M81, M82 and M83 — added to the family around April Fool's Day [CW, March 30].

World Standards

Public data networks in the U.S. and other nations are based on X.25 and X.21, which are recommended as world standards by the Consultative Committee on International Telephone and Telegraph (CCITT), a United Nations affiliate.

X.25 defines three protocols for packet-switching, a method of data communications employed by public data networks to optimize usage of telephone lines. X.21 defines the interface between a user's processors or terminals and public data networks.

Until last week's announcement of support for the CCITT protocols, SNA stood at odds with an international drive for "open systems interconnection" — peer relations among different brands of systems in a network. The International Standards Organization (ISO) favors X.25 and X.21 in its developing model for open systems.

Since its 1974 debut, SNA has insisted on master-slave relations among systems in a network and, according to experts, made it difficult for those systems to be other than IBM systems. Master-slave relations tend to enforce centralization of a large user's DP resources. This typically makes fairly high-level executives out of the people IBM salesmen might contact.

Last year, IBM spokesmen began expressing support for the ISO's open systems project. A "statement of direction" was issued, endorsing the basic concept of open systems and acknowledging that IBM offered X.25 compatibility in some foreign countries. However, IBM chief scientist and vice-president Lewis M. Branscomb said at the time IBM would not precede the common carriers with domestic support for the

CCITT protocol [CW, Nov. 3].

Common carriers have not announced widespread X.25 availability (Bell watchers speculated the support would come with AT&T's Advanced Communications Service),

Analysis

but IBM had two major reasons to contradict its chief scientist.

First, large financial institutions pressured IBM to grant them X.25 for communications with overseas branches [CW, Nov. 24]. The Federal Reserve System even gave signs it might order banks to feature the protocol. In fact, the president of IBM's

Systems Communication Division, Allen J. Krowe, revealed in January that IBM proposed X.25 compatibility in a bid submitted to the Federal Reserve System for a major upgrade of its electronic funds transfer facilities [CW, Jan. 19].

A second reason for IBM to come through with X.25 was pressure from competitive vendors. For example, San Jose, Calif.-based Systar Corp. released a front-end system that gives X.25 to IBM's System/34 and System/38 [CW, May 18]. Other vendors, such as NCR Comten, Inc. used X.25 compatibility to hammer away at 3705 sales.

Around the time of Systar's announcement, an IBM General Systems Division (GSD) product manager

admitted that GSD was selling X.25 compatibility with its Series/1 minicomputer. The compatibility, in the form of a software package and two circuit cards, quietly went on the market in fourth quarter 1980 — about the time Branscomb said IBM would not offer X.25 before the common carriers [CW, May 25].

SNA has altered course with last week's announcement of 3705-resident X.25 software and a network interface adapter for conversions between SNA's Synchronous Data Link Control protocol and X.25. The architecture may dominate data communications in most parts of the world, but it must tolerate peer relations among many brands of systems to do so.

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What Would The Babe Think?

(Continued from Page 1)

the players are the statistical products of a computer's programs.

Although the teams of both the American and National Leagues have been on strike for nearly two months, since June 30 a radio station here has been broadcasting seemingly "live" Red Sox ball games that apparently come from Boston's Fenway Park.

Using a computer-produced game called Strat-O-Matic, announcers at WITS radio regularly deliver a play-by-play account of sometimes grueling contests that have never occurred. While listeners thrill to the taped sounds of the crowds and cheer their favorite team on to victory, the only action that takes place is the roll of the game's dice.

"Announcers create pitches, complete with balls, strikes and hit players," Richard Chmura, vice-president and general manager of WITS sports department, explained. "It sounds so

real we got calls from people when we first started broadcasting saying, 'Hey, why didn't you tell us the strike was over?'

"In fact, we had a guy who lives in Kenmore Square near Fenway who swore he could hear the crowd cheering."

Compiled by an IBM 370/138 computer, the game contains detailed records on each player that show his chance of making a catch, a double play or an error during a typical game. Each player's league statistics and averages from the previous year are gathered by the Strat-O-Matic Game Co. in Glen Head, N.Y. These statistics, along with a number of arbitrary fielding and running ratings and other sports information collected by the staff, are sent to Banner Computer Services, Inc., a service bureau located in New York City, that processes the information.

"The computer puts these statistics into percentages and then works out

dice probability percentages that are placed on the cards," Hal Richman, Strat-O-Matic's president, said. The computer makes about 200 decisions per player. In all, it takes the computer roughly 400 hours to assemble an entire season for the firm's basic game and about 1,400 hours to compile the advanced version.

In Boston, WITS has been using both the basic and advanced editions of the game for its big-league broadcasts. Because the station depends heavily on the use of sound effects to provide the feel of the park, the game is usually played by local celebrities prior to the game's actual broadcast. The station's two play-by-play announcers then use the results of the game and these sound effects to script an entire nine-inning baseball game. The whole game, with its runs, outs and foul balls, takes about an hour to complete, WITS sports manager Chmura pointed out.

Because the Boston station is the flagship for an 83-station network, the dramatized games are broadcast throughout the country, he said.

Although WITS is taking its digital season seriously — Chmura was recently named commissioner of the Strat-O-Matic games by the radio station's staff — it is not trying to fool people into accepting the computer-produced game as a substitute for Abner Doubleday's temporarily canceled sport.

Stations in Washington, D.C., Detroit, San Diego and other cities recently used the board game to simulate last month's All-Star Game that pits outstanding players of the American League against similarly talented players of the National League. As expected, because Strat-O-Matic is essentially a game of chance, the winner of the league battle depended upon what radio station you were tuned in to at the time.

"It's not baseball, but it's the next best thing to it," Strat-O-Matic Commissioner Chmura observed.

STC Makes Bid For Memorex

LOUISVILLE, Colo. — Capping several weeks of rumors, Storage Technology Corp. (STC) made a written offer last week to acquire Memorex Corp.

The offer provides for an exchange of four-tenths of one share of STC stock for each outstanding share of Memorex common stock.

Negotiations between the two companies began about two weeks ago, just prior to Memorex's announcement of a \$24 million loss for its second quarter, the fifth consecutive quarterly loss reported by the firm. (See related story on Page 61.)

The current offer represented a premium of about one-third more than the market price of Memorex stock when acquisition rumors started. At that time, Memorex stock was trading at about \$8 per share.

The STC offer translates to about a \$12-per-share price for Memorex stockholders and, despite the recent climb in the price of Memorex stock, STC Chairman and President Jesse I. Aweida said he considers his company's offer "fair and in the best interest of the shareholders of both companies."

The acquisition is subject to approval by the boards of directors of both companies. These boards will meet probably within the next two weeks, STC said.

Corrections

The issue of June 15 included a story on The Computer Company, a Richmond, Va.-based service bureau fined for poor performance ("Service Bureau Fined \$25,000 for Performance"). Following its usual practice, CW referred to that company by its acronym (TCC). Later, CW received a letter from The Continuum Company, Inc. of Austin, Texas, stating that the latter has a service mark registration for TCC which covers specified computer services. The letter also stated "there is no connection whatsoever between The Computer Company and The Continuum Company, Inc."

The correct title of Shoshannah Zuffo's research paper for MIT's Center for Information Systems Research is "Psychological and Organizational Implications of Computer-Mediated Work." The paper, available for \$2, found workers at odds with computerization [CW, July 27].

Consultant John K. McKenna was described as trying to hire DPs willing to understand management [CW, July 27]. He is encouraging DPs to be willing to understand management.

Professionals Unlimited's directory of IBM System/34 software service vendors was incorrectly listed as being available for \$11.95. The cost is \$11.95 plus a diskette that must be sent with the order to enable users to print the directory or view it on a System 34 workstation.

One or two 80M-byte disk drives, not 1M- or 2M-byte disk drives, can be connected to Rianda Electronics, Ltd.'s Atlas disk controller ["Disk Controller Out for LSI-11 Micro Series," CW, July 20].



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Users Given Dos, Don'ts In Software Buying Game

By Rita Shoor
CW Staff

CAMBRIDGE, Mass. — Can you imagine buying a software package just to get the salesman out of your office? It's happened a surprising number of times, Thomas J. Sullivan told attendees at the Harvard Computer Graphics Week conference here.

Unnecessary purchases can be avoided by following a specific methodology when acquiring software. "Software purchases don't just magically happen," the manager of product development for International Computer Programs, Inc. (ICP) said.

He began his presentation by describing the four classes of software vendors for a standing-room-only audience at the session "What You Should Know about Acquiring Computer Graphics Software."

There are the hardware vendors offering software packages to their customer base. These vendors have "a vested interest in selling the gear," he said. So their software products may well be designed to sell hardware rather than meet the customer's software needs.

Universities also develop software packages that meet needs in the commercial market. However, buyers should be aware that support and enhancements they can expect to receive from the groves of academe may not meet maintenance needs.

Time-Sharing Vendors

Time-sharing firms offering graphics packages are the third vendor group. You must "watch the cost equation very carefully" with time-sharing, Sullivan said.

Independent software suppliers let end users "begin to reduce the risks" of software acquisition, he said, offering the following pointers on buying products from these vendors: Begin by requesting brochures and product specifications from the likely vendors for your environment, give the vendor the parameters in which he must operate and let him know that you don't want to talk to salesmen at this stage.

Sullivan then recommended obtaining total user lists. Find out how long other end users have utilized the system and how closely it aligns with their requirements. Get a feel for the level of user satisfaction with the product.

"Don't take a chance on an unknown vendor," he said. Find out how long the seller has been in business and whether there are offices in your geographical area.

At this point, the potential customer should be able to pinpoint two or three finalists. Provide them with a formal request for proposal (RFP) that details your requirements and bring them in for an on-site presentation.

And "avoid the salesman/counselor" who offers to help you develop the RFP that will be going out to his competition, Sullivan cautioned.

The formal vendor presentations should be made to all involved parties, including management and end-user representatives as well as

personnel from the DP area. These people can then jointly determine which of the products will best serve their organizational requirements, he said.

Sullivan also maintained that buyers should unequivocally reject vendors who:

- Don't warrant against program defects for at least one year.
- Don't agree to accept financial liability if the product fails to perform.
- Don't clearly define maintenance terms and costs.
- Don't state in writing that you are getting the latest version of the system and paying no more than the lowest price paid by other users.

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- 2) Kevin selected the content of these books based on an analysis of the tasks normally required of an applications programmer. That's why these books contain everything of use to the average programmer and very little that isn't. That's also why the books give substantial coverage to job-control language. The DOS book covers DOS and DOS/VS; the OS book covers MFT, MVT, VS1, and VS2.
- 3) The books are organized in the most effective way possible for a programming course. Quite simply, a complete subset

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Honeywell Increases Peripheral Rental, Lease Rates

WALTHAM, Mass. — Honeywell, Inc. last week increased its monthly lease and rental charges by 7% and maintenance fees by up to 20% on a number of its disk drives, printers and unit record equipment.

At the same time, the firm also hiked the software license fees on selected systems and applications software from 15% to 20% and increased by 5% the monthly system engineering charges for its entire product line.

The price changes will become effective Oct. 1 for installed equipment and Aug. 1 for new business. The lease and rental price in-

creases and the maintenance price increases affect peripherals designed for the company's DPS 8, DPS 8M, DPS 8C and Levels 68, 66, 64, 62 and 61 computers.

While the lease/rental and maintenance increases amount to from 7% to 20%, when applied across a representative system configuration the hikes amount to between 1% and 2% and to less than 4%, respectively, a spokesman said.

Besides raising its system engineering fees by 5%, the firm also increased its on-call hourly and time and materials rates from 10% to 15%, a company spokesman said.

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Today's Top Brass Eyeing War Room Graphics

By Bill Laberis
CW Staff

CAMBRIDGE, Mass. — With its tilt-swivel chairs, large rear-projection screen and sleek control console, the corporate war room is a far cry from the traditional boardroom dominated

by an imposing, long table. And secreted behind the walls are the guts of a half-million dollar management communications system, the likes of which corporate mastodons will find essential to conducting business in today's changing

world.

This was war room designer W. Robert Widener's message as he spoke as part of a panel titled "Best Applications of Corporate War Room Graphics" at Harvard Computer Graphics Week 1981 last week.

According to Widener, the paper tiger is alive and growing, threatening to swamp top corporate management in a sea of confusing and often redundant periodic reports.

Also, most such reports are out-of-date within days of being drafted, if not sooner, he said.

"There is no need for management having anything but the most current financial and operating statistics, which are readily available right in the mainframe," Widener said. "With things changing the way they do in a multinational business setting, top brass is finding it must have the latest information within easy access. Management is, in fact, beginning to demand it."

DP War Room

What management needs is a central repository for all relevant economic, financial and other statistical business data, a repository independent of the DP department and part of top management's exclusive domain, he said.

This is the war room where the touch of a finger against a skin-sensitive screen calls up the latest available corporate information for vivid color graphics display, a room where a largely paperless, comprehensive work session can be held.

"The total war room makes extensive use of full-color graphics to condense a mountain of information into a readily addressable and readable form," Widener commented. "Computer graphics is simply the ultimate management output in the war room setting."

Widener, whose Intelligene Interlink Corp. has installed 60 such war rooms and communications centers, said the historical information stored in almost any corporate CPU can be translated into graphs, which at a glance give monthly trends, averages and cyclical data.

He singled out the case of the Banco Nacional de Mexico, which recently installed a war room costing nearly \$600,000.

The bank's war room features a real-time interactive graphics system with specialized software that permits one man, the president, to simply operate and manipulate a wide array of peripherals.

But all is not roses at the \$10 billion bank since the system installation, according to Sergio Ramirez, bank controller.

Speaking through an interpreter after the panel session, Ramirez said the war room installation has caused "many big problems" to develop between top management and the bank's extensive DP department, which was not consulted about the war room.

Instead, the war room is an independent management-driven and exclusively management-serving entity that has "created the awareness of deficiencies further down in the (DP) department," according to Ramirez.

But management-DP department rifts notwithstanding, Widener and the other panel members said the war room with its state-of-the-art interactive graphics is a sure bet to increase management productivity in quantum leaps.

"We're talking as much as a 30:1 productivity factor, meaning an executive can at times assemble the information he needs for a presentation in minutes where it formerly would take him hours, even days," said Irvin Miller, senior graphics specialist at IBM.

"And with an interactive system, the executive can respond to change literally minutes before a presentation," he added. "In a war room environment, speed is most important."

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Tailor Hardware to Applications

Orr: Assess User Needs Before Going Graphic

By Bill Laberis
CW Staff

CAMBRIDGE, Mass. — Before taking the computer graphics plunge, users should painstakingly evaluate their needs, then seek out the hardware suited to their individual applications.

"In other words, let us not be the lovers of a cure looking for a disease — buy only what you really need," said Dr. Joel Orr of Orr Associates, Inc., who spoke before a packed audience of 300 at last week's Harvard Computer Graphics Week 1981.

Indeed, if there was a single theme played by all panelists during the how-to-buy graphics hardware ses-

sions, it was "look carefully before you take a \$50,000 to \$200,000 leap," without losing sight of the potential productivity payoffs of graphics.

"Indeed, if there was a single theme played by all panelists during the how-to-buy graphics hardware sessions, it was 'look carefully before you take a \$50,000 to \$200,000 [graphics] leap,' without losing sight of the potential productivity payoffs of graphics."

Carl Machover of Machover Associates Corp. of White Plains, N.Y., urged users to use a shopping list approach to buying a graphics system. His approach consists of assigning point values to a number of criteria,

all based on applications needs.

"You can do whatever you want — simulation, forecasting, modeling, the whole works — as long as you

have the money," according to Machover.

Machover's recommended list was headed by an appraisal of data content and picture quality needs. The point here, Machover said, is that

vendors are offering a large and growing selection of graphics terminals and output devices, all with varying degrees of picture clarity or resolution.

The difference among them, of course, is the price, he said. Systems can vary in price from \$2,500 to more than \$100,000. And what is a picture of unacceptable quality to one user is perfectly suitable to another, the sole determinant being individual need, he said.

Plummeting Costs

The choice between a color and black and white terminal has become less of a choice over time because of the rapidly plummeting price of color graphics, he continued.

"Color is getting to be the default proposition — it is becoming so cheap that it is almost mandatory," Machover said.

In addition, recent advances in color graphics software, such as Issco Corp.'s enhanced Tell-A-Graf, which uses English language commands and now allows screen previewing of graphs, are resulting in growing management demand for color graphics.

Machover said that graphics software development is still lagging behind the almost weekly announcements in hardware, but is catching up with the specialized applications needs fostered by explosive current and projected growth in graphics.

Vendor, Human Factors

Finally, before considering the purchase price, the user should make further inquiries into vendor viability, asking whether the vendor is likely to be around to service the equipment or whether the vendor is planning to discontinue the line he is trying to sell, according to Machover.

"Don't forget human factors, because the productivity gains are directly related to how well your people get along with the new system," he said.

He noted that in an effort to get better quality high-resolution pictures, several vendors have reduced the brightness of their screen displays. In subdued light, these system color displays are intense, but the images appear washed out in normal light.

All the above criteria should be carefully scrutinized and then evaluated in accordance with the user's needs and intended applications, according to Machover.

Looking ahead just 12 months, Allen Paller of AUI Data Graphics, Inc. in Washington, D.C., said users can look forward to further price declines in color and black-and-white graphics terminals, as well as to an "explosion of graphics systems designed especially for the micros."

"You will also see absolutely fierce competition in the office automation arena among all the heavyweights, Digital Equipment Corp., Wang Laboratories, Inc., Xerox Corp. and the Japanese, all fighting it out for office supremacy with new, lower cost systems that might promise the moon," according to Paller. "Just be careful, but don't lose out, either."

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IBM Enhances 'Elias-1' Package, Extends Support to VSE/Vsam

WHITE PLAINS, N.Y. — IBM has announced Release 2 of its Entry Level Interactive Application System-One (Elias-1) for applications that run in CICS/DOS/VS, DL/1 DOS/VS and VSE/Vsam environments.

The program product, introduced in January, was designed to increase productivity for designers and programmers. The package runs under the VSE/Interactive Computer Control Facility (VSE/ICCF). IBM said it is to be used with one of the current VSE System IPO/E environments including Vtm or Vtm/E.

Among the enhancements provided with Release 2 is the ability to develop application programs using the facilities provided by the DL/1 High Level Programming Interface, such as program framework generation, Elias-1 editors and bricks. Bricks

are the individual components of the program product's building block strategy, IBM said.

Support Extended

In addition, Elias-1 support was extended to all types of VSE/Vsam files for Cobol and PL/I programs in a batch or on-line mode. This support covers program framework generation (error handling) and coding of VSE/Vsam file access statements by using specific bricks, IBM said.

Also announced as part of Release 2 was a procedure that automatically generates a program specification block (PSB) table in the Elias-1 format from existing DL/1 DOS/VS control blocks.

Other enhancements include: DL/1 field-level sensitivity support; data dictionary support that allows the export of PL/I structures to IBM's Data Base/Data Com-

munications Data Dictionary; a summary panel that provides the ability to inspect data stored in the Elias-1 tables, which will be used to generate an output skeleton of a procedure; a job stream submission facility improvement that allows the user to avoid recreating a job stream every time a related program or macro set is updated; and, support of the VSE source statement library.

Elias-1 runs on any 370, 30 series or 4300 processor supported by the VSE Advanced Functions program product. It requires a minimum of 768K bytes of virtual storage, IBM said.

Elias-1 Release 2 will be available in September and will cost \$164/mo; for users under the Distributed Systems License Option, it will cost \$123/mo. The monthly support charge is \$13 for the first processor and \$8 for subsequent processors.

Handbook Announced For CICS/VS Version 1.5

RIVER EDGE, N.J. — On-Line Software International, Inc. has announced that its CICS/VS Reference Handbook for Version 1.5 will be available for purchase Sept. 15.

The pocket-size reference book includes programming, debugging and control information for CICS/VS Version 1.5. It is said to represent a major revision of the 1.4 handbook.

The handbook's 11 sections

include macro-level application programming, command-level application programming, debugging facilities, main storage areas and conversion charts.

Version 1.5 of the handbook costs \$25 and discounts are available for multiple copies. Those interested in obtaining the handbook can contact Susan Huber at On-Line Software International, 65 Rt. 4 E., River Edge, N.J. 07661, (800) 526-0272.

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'First' to Receive Federal Certification

S.C. Goes Data Base With Medicaid System

By Rita Shoor
CW Staff

COLUMBIA, S.C. — South Carolina recently became the first state to obtain federal certification for a data base-oriented Medicaid system.

The system came to fruition through the combined efforts of technicians at the state Department of Social Services (DSS) and Clemson University, with some outside help from Touche Ross and Co. consultants.

The claim of being the first data base-oriented Medicaid system is unofficial, noted Jack Peck, who directs Clemson's Division of Information Systems Development. It is based upon informal comments from federal reviewer Don Allen, who used the term "data base management system [DBMS] in a very strict sense."

Allen — again unofficially — declared himself "very impressed" with the system, which utilizes Cullinane Database Systems, Inc.'s Integrated Data Management System (IDMS).

The reviewer based his pronouncement on Medicaid experience harking back to Ohio's implementation — the first Medicaid system to get the federal nod, Peck said.

Certification is worthwhile since it means the federal government picks up 75% of all costs associated with processing a Medicaid claim, retroactive to March, 1980, explained Buddy Price, acting director of DSS. Non-certification means a 50-50 split between the state and federal governments, he said.

Obtaining the federal blessing took nearly four years and approximately \$4 million, Price recalled. It also required a lot of time and effort spent in justifying in-state development rather than going to one of the fiscal agents who handle Medicaid processing for other states, he said.

Part of that justification was necessitated by letters from those agents, notably EDS Federal, to members of the state legislature, according to Price. At one point, there was a 90-day hiatus in the development effort because of these letters. And even though the system has been processing all claim types for nearly a year, he "heard some talk about bringing in a fiscal agent" as recently as two weeks ago. "There are still some adversaries out there," he said.

Original Systems

Currently handling 50 million claims annually, the state's system originally consisted of 13 subsystems.

In 1977, federal auditors and South Carolina's Legislative Audit Council jointly determined that the Medicaid processing was "very deficient" in management reporting and recommended developing a system to meet federal certification standards.

The project began with a five-member project team surveying each of the 50 states "to find out where they were." Eventually, the team went to Kentucky, Minnesota and Arkansas in search of a Medicaid Management Information System (MMIS) that could be transferred to South Carolina.

Minnesota's MMIS code and documentation were picked for the journey to warmer climes. But questions about code maintainability led to a decision to generate a new system that was based upon concepts used in Minnesota. DSS personnel were supposed to supervise and control the implementation with detailed system design and programming handled by Clemson programmers and designers on a contractual basis, Price explained. Generating the MMIS requirements document was to be assigned to an outside consulting firm.

A formal request for proposal from consulting firms was approved in

November, 1977. That is when fiscal agent competitors brought things to a screeching, if temporary, halt. We "got the word to stop" one day before the proposal request was scheduled to go out, Price said. Legislators had reportedly received letters from EDS claiming that it could save the state money on its proposed MMIS and "that started the investigation."

A task force composed of representatives from DSS and the governor's office, headed by Computer Systems Management Director Charles Burr, was formed to investigate alternatives. It took about three months to decide that "no significant savings would result if a fiscal agent did the

processing," Price said. The state also felt that it would have "better control if its own people did the work," Peck noted.

The formal request for proposal was finally mailed in March 1978 and Touche Ross won the contract two months later. The consultants sent the finished copy of the requirements document to Clemson in January, 1979 and, thanks to some 12-hour days from Clemson and DSS staff, the first claim was processed six months later. Implementation proceeded in phases and the system was running all claim types on Clemson's IBM 3033 mainframe by September 1980.

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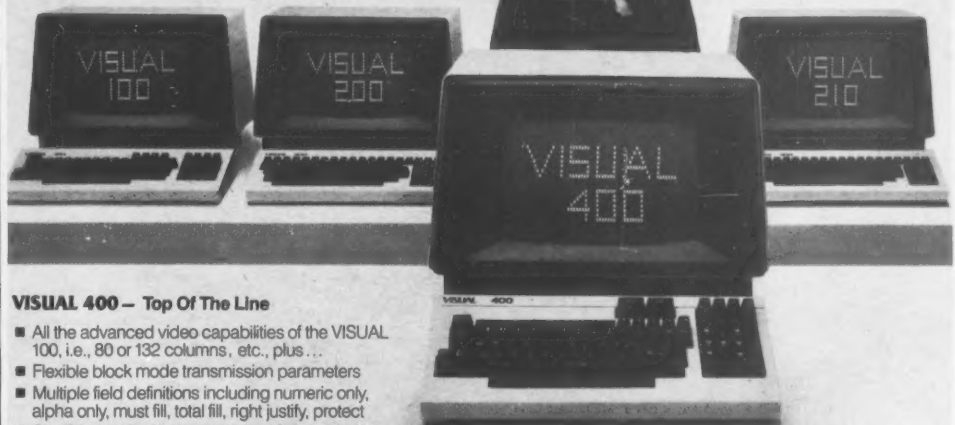
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Computer-Aided Theft Ring Smashed

Florida Officials Put Lid on Food Stamp Fraud

By Bill Laberis
CW Staff

NORTH MIAMI, Fla. — State investigators have smashed a food stamp fraud ring that successfully pilfered thousands of the marketable coupons in a carefully orchestrated, computer-aided scam.

The heist has been assailed by the fraud division of the state Auditor General's Office, which has charged that inadequate distribution regulations handed down by the U.S. Department of Agriculture (USDA) have made food stamp fraud "inviting, if not altogether simple."

"They [the thieves] put their heads together here and knew how to get around the built-in security measures, the electronic and the manual ones," said Billy G. Davis, director of the public service fraud division for the auditor general's office. "Then they just plain went to town."

Ring members operated at all levels of the state's computerized distribution system, from data entry to systems control analysis to cashiering, the state auditor general's office has alleged.

Seven Employees Fired

Thus far, seven employees and former employees of the Model Cities Food Stamp Center here have been fired in connection with the theft. At press time, the state Attorney General's Office had just issued arrest war-

rants for four of the seven, charging each with grand theft (in excess of \$20,000), conspiracy to commit grand theft and food stamp fraud.

If convicted as charged, each ring member could be sentenced to up to 20 years in state prison.

In addition, the inspector general's office of the USDA in Atlanta has launched its own investigation into the computer-assisted theft, and charges and indictments from it may be forthcoming.

Fraud Operation

The thieves initiated the scam at the data entry level, where a compromised data entry clerk instructed the system to prepare food coupons for either a fictitious person or for a member of the ring, according to a report filed by the auditor general's office.

Henry Newbold, a systems control worker whose function it was to check the data entry clerk's work for accuracy, then allegedly ignored the illicit entries, some of which would instruct the system to pay out in a single payment up to hundreds of dollars in stamps, the auditor general's office said.

The process then continued through case eligibility workers on up to cashiers, some of whom released stamps without so much as requesting recipient signatures, the report shows.

Davis' initial report states the seven stole \$175,000 in stamps over an unspecified period of time, an amount equal to what cashiers had paid out with unsigned receipts.

But Davis said the actual total is "considerably higher than that, perhaps many times higher." He added that his investigative report, recently completed and handed over to the state attorney general's office, "has just scratched the surface as far as determining how much was really taken, and over what period of time from that one [North Miami] office."

Davis explained that making an accurate estimation of the total take would involve "more man-hours than we could spend," adding that sufficient evidence now exists for the attorney general's office to proceed with the prosecutions.

Meanwhile, Davis has seized the opportunity to blast the USDA for what he claims is that agency's blatant disregard for tighter controls and regulations in the disbursement of hundreds of millions of dollars in food stamps annually.

"From what we have learned here, the [food stamp] program is set up so loose to not exclude anyone in need that it easily affords ample opportunities for large scale rip-offs," Davis charged. "I know the state of Florida has requested stronger regulations, and the USDA has refused us, time and time again."

Davis said his office sampled one month's worth (November 1979) of food stamp data. Using programmed statistical analysis and projections, his office found that over \$4 million in food stamps were fraudulently issued in that one month. Davis said the estimate was "a very conservative one."

"The ongoing rip-offs really boggle the mind, especially when you extrapolate our findings for the amount of fraud in one month to a nationwide total," he said. "I have to say it isn't really computer fraud, per se. The computer perhaps just makes it easier to steal, sort of streamlines things, although it is certainly tough to track after the fact, if only for the sheer magnitude of the thefts."

Similar Scams

However, investigators' woes are just beginning. State and federal authorities recently arrested two individuals who falsified commercial papers in order to function as repositories for stolen and pilfered food stamps.

The Miami pair, using a nonexistent business as a front, cashed an estimated \$17,000 worth of fraudulently issued stamps per month. Investigators believe the pair and others running similar scams may be largely replacing the less structured street-level black markets for food stamps.

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Computer-Aided Search Fails to Find Titanic

By Bill Laberis
CW Staff

BOSTON — Finding the Titanic is going to take more than a 30-member search team supported by three shipboard computers, sophisticated sounding gear and a host of onshore DP backup.

"It's going to take some luck, my friend, and even then she may never be found," said Mike Harris, leader of a search expedition for the Titanic, which returned nearly empty-handed here two weeks ago.

Now back on land, the computer-assisted search is continuing for the White Star liner that sank off the Newfoundland coast on its maiden voyage 69 years ago. The Titanic carried 1,513 people and a fortune in jewels, currency and gold bullion to the bottom.

Many of the expedition's findings, stored on magnetic tape during the two-week mission, are awaiting digital analysis at the Scripps Institute of Oceanography at the University of California and at the Lamont-Doherty Geological Observatory in New York.

But the technicians who wearily disembarked from the research vessel Gyre made it perfectly clear the expedition did not even come close to locating a "Titanic-sized object."

"We now know lots of places where she definitely is not," Harris said at a dockside interview. "I'm convinced she's still down there and in one big piece."

Dr. Carl Lowenstein, shipboard computer technician and research oceanographer, said the expedition team used two of its own portable computer systems in addition to the Gyre's Hewlett-Packard Co. HP 2100A.

Primary System

The primary system was a Digital Equipment Corp. PDP-11/40 mini-computer to which the team attached a series of I/O devices, including a Texas Instruments, Inc. slow-speed printer, terminals and a Calcomp, Inc. 30-in. square flathead plotter that ran in real-time to assist in underwater video scanning.

"By operating in real-time with the Calcomp plotter, we could log data for future analysis, knowing we could go back on a chart to the exact spot where we later picked up on something interesting," Lowenstein explained.

The video equipment had been dragged across the ocean floor on board a specially designed sled, passing once over the 60-square mile search area.

The PDP-11/40 was also used to generate the navigational charts the crew used to ensure they had covered the targeted area with a minimum of redundancy. Lowenstein displayed the charted results of the Gyre's undersea scanning which, when plotted, resembled a drunken sailor's haphazard course through a crowded harbor.



CW Photo by B. Laberis

There was little to smile about as Titanic expedition financier Jack Grimm, left, and expedition leader Mike Harris met with reporters shortly after returning to port.

However, Lowenstein said there was a well-intended purpose behind the wandering lines of the sled's course.

In addition, a DEC LSI-11 microcomputer was used to store and analyze data dredged up by sonar soundings, much of which is awaiting future analysis. Among the graphic findings to be analyzed with digital image analysis are photos of bottles, an object believed to be a davit or small hook used to secure a lifeboat and a photo of what appears to be a blade of a very large propeller.

The microcomputer also helped researchers plot a sort of mosaic of the searched area, Lowenstein said.

"This will be useful particularly the next time we go out, although it would have been nice to find a little something more this time," he said.

But will there be a next time? Expedition financier and Texas oil millionaire Jack Grimm said at dockside he will not rest until he has found the Titanic.

Grimm may have a long wait. For one thing, two futile search efforts for the Titanic have cost Grimm \$2 million in out-of-pocket expenses.

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The surroundings and the operator's attire are unusual, but the CRT terminal's function is a traditional one at the Carr Fork copper mine, where it is used to record equipment requisitions on-line for transmission to an IBM 4341 mainframe in the above-ground DP department.

Mining Operation Uses Terminals 4,000 Feet Under

By Lois Paul
CW Staff

TOOELE, Utah — Miners here who formerly scrawled equipment requisitions on the back of a matchbook cover and sent it to the surface to be filled will soon be entering their requests on CRT terminal screens 4,000 feet underground.

Anaconda Copper Co. is in the process of installing up to six IBM 3270 terminals in its Carr Fork Mine beneath the Oquirrh Mountains.

The terminals will be connected to an IBM 4341 mainframe with 2M bytes of memory in the company's DP department and are intended mainly for the requisitioning of materials for maintenance, according to DP manager Jay Furca.

The first phase, which is being installed in August, will provide an on-line, real-time system to enable management to capture production and maintenance history statistics from the mine. Lloyd Vowles, the former DP manager who now manages all DP field operations for Anaconda, explained.

Phase Nucleus

The nucleus of the first phase is a data base-oriented cost system the department designed that will capture cost and statistical information from the mine via the terminals.

The mine includes various kinds of mobile equipment, including jumbo

drills, front-end loaders, locomotives, rail cars and support vehicles such as explosive trucks.

"What we want to do is keep track of the maintenance costs and the statistical information about that equipment," Vowles explained.

All requisitions for parts and supplies, whether they come from the warehouse on the mine's property or through purchase orders will be entered into the terminals in the mine or in the above-ground plant.

Subsequent Transactions

Subsequent transactions regarding stock items delivered to the mine also will be updated on-line and will be shown on the history of the piece of equipment being serviced.

From this data, unit cost and unit performance statistical reports will be generated for management and, eventually, a maintenance planning system will be developed to enable management to make decisions on when to schedule maintenance on equipment, according to Vowles.

Another goal is to supply management with cost effectiveness on a unit basis, rather than just on a dollar basis, Vowles said.

"We would like to know and be able to budget for things such as drilling supplies and manpower on a per unit basis. We want to know how many tons of ore we get out of the mine per man-shift and how much our drilling supplies cost per ton of ore," he added.

Anaconda's 15-person DP department installed an IBM 4341 in September 1980. It is running under the DOS/VSE operating system and Furca's shop is putting up IBM VM system software. The department also is using CICS.

"Maintenance here is an extremely important operation," he explained. "It has to be available. This is one of the reasons they went into this. Everything was so laborious and incomplete in batch.

"Before, they filled out everything manually and it was hand-carried, brought up and the material was sent back down to the mine," Furca explained. The terminals will enable all requisitioning and approvals to be made on the system, on-line, and material will be issued immediately.



With the use of terminals in the mine, parts are rapidly directed from a surface warehouse to Anaconda Copper Co.'s equipment maintenance and repair "garage" 3,000 feet underground.

To Advise on Car Repair, Houseplants Expert Systems Seen in Future Households

By Lois Paul

CW Staff

ST. PAUL-DE-VENTE, France — Feeding your houseplants or repairing your automobile in the future may involve the use of a "hand-held expert system" that will tell you, respectively, how much plant food to use and which bolt needs tightening.

These are the projections of Professor Edward Feigenbaum, chairman of the Department of Computer Science at Stanford University, who discussed recent developments in artificial intelligence systems at Sperry Univac's seminar for the UK press here.

An expert system consists of a knowledge base that includes facts and heuristic or judgmental processes and an inference procedure for drawing conclusions or taking action on the basis of knowledge in the knowledge base, Feigenbaum explained.

He described the process as

"knowledge engineering," which is a method of literally tapping the brains of experts in particular fields and producing software that generates hypotheses, solutions, advice, diagnoses and therapy.

The critical problem, Feigenbaum said, is getting the knowledge of these experts into the computer.

Mycin Program

The Mycin program, which was developed in this manner, consists of an interactive dialogue leading to diagnoses and therapy recommendations for physicians dealing with blood infectious meningitis.

A user can ask questions such as "Why didn't you consider treatment with tetracycline?" and the program explains this to the user, building its line of reasoning.

In an evaluation of Mycin's effectiveness regarding proposed diagnoses and treatments, Feigenbaum said the program "just about tied for

first" with the infectious disease faculty-member "experts" who helped develop Mycin.

Another "expert system" developed at Stanford is Puff, which is designed to offer pulmonary function diagnosis. This program analyzes patient data and produces recommendations that are added to the patient record.

It is being used at one laboratory where it runs on a Digital Equipment Corp. PDP-11 minicomputer. Another program is Sacon for structural engineering calculations.

"It takes a long time to dig out the knowledge of expertise," Feigenbaum said.

The work on expert systems began in 1965, he said, with the study of molecular genetics. Molgen, a software package developed in 1980, gave experts symbol manipulation software tools for DNA sequence analysis, according to Feigenbaum.

Although there was no official an-

nouncement of the program, there were 200 academic users within a six-month period, he said. Molgen was developed under Stanford University's Medical Experimental Computer for Artificial Intelligence in Medicine network.

Intelligenetics, a California company, was formed to sell Molgen as a commercial package under license by Stanford University, Feigenbaum said. He added that the most powerful means of selling the software has been to send out the code or let others run it.

The current trend for expert systems is the development of software packages. "This is what we pass on to the next generation of knowledge engineers," Feigenbaum said.

Future Applications

Possible applications for expert systems in the future are in the consumer or home electronics market, which would include games. "The profit is in the hand-held expert system as a symbol manipulator, not a calculator," he said.

Such a system could be used in plant care, he explained, where few people know how to do it well, or in automobile repair. Feigenbaum cited the American tendency toward "do-it-yourself" methods as a natural medium for use of these expert systems.

In the technical market, expert systems could be developed to aid the diagnosis of equipment failure and recommendations for repair, particularly in light of the increasing shortage of trained technical people.

His department is working with IBM and DEC regarding systems for troubleshooting and repair, he said.

Other potential markets are in the military area, the design of large-scale integration and very large-scale integration chips, signal interpretation, intelligence agents and office automation, Feigenbaum said.

Dr. Penny Nii, also of Stanford's computer science department, added, "It will take another 10 years for knowledge engineering to be accepted." The systems are mostly involved with laboratory work. Moving from research to industry is going to require a broad jump, she said.

There are fewer than 100 knowledge engineers in the world, Nii said, adding that it would take about two years to train an individual programmer in this field.

"You are going from a numerical calculation approach to a symbolic approach," she said. Knowledge engineers do not work through the traditional route of specifying, programming and debugging software.

"How can we get a computer to learn so we do not have to feed in all of that information?" is the major problem and Nii said her department is working on this.

Asked about the prospect of developing an expert system for management decision making, Feigenbaum said that the Stanford Business School "experts," top date have been unresponsive to requests to work on this type of program. He said he foresees the eventual move into this area as a natural extension of knowledge engineering.

UK Unemployment Blamed on Rivalry

ST. PAUL-DE-VENTE, France — The rate of unemployment in the UK is growing and it is not a consequence of chip technology. Rather, it is a consequence of new competition.

"Chip technology has produced literally millions of new jobs, but unfortunately not in the UK," Sir Ieuan Maddock, principal of St. Edmund Hall at Oxford, said here at Sperry Univac's recent seminar for the UK press.

The changes are occurring outside Britain, beyond its control, he said, noting that the country cannot stop the Japanese and the Taiwanese from being efficient or from copying British products. "It is an illusion to think we have so much control over this fate."

Maddock predicted a shift in em-

ployment in the UK, with fewer jobs in the manufacturing industries and more people moving into the social and leisure industries. Eventually, there will be a shorter working life, involving not early retirement, but more time spent in retraining and education, he said.

According to Maddock, there will be increasing job changes within the next two decades. "Not only will people have to look into more and more job changes, but changes in the types of jobs," he said.

Retraining of individuals for jobs will no longer involve fitting them for the same types of industries, but "retraining" them to suit entirely new occupations.

The technological explosion is only one of the factors causing changes in

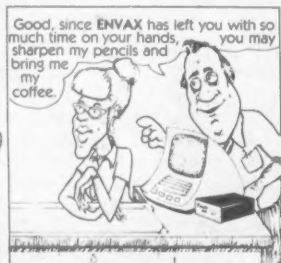
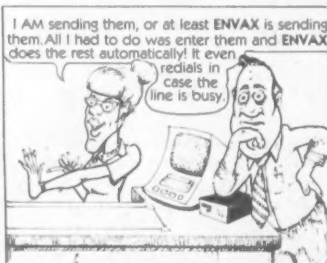
the face of employment, Maddock asserted, citing recognition that the earth's resources are limited, the expanding population and the communications mobility of technology as other constraints.

"We are in danger of ascribing too many of the bogeys and the threats to that technology," he said.

The ability to absorb the technology, Maddock said, is directly related to the educational level. However, if the UK produces a large, very high educational environment, this will strip people from the industry, he explained.

It also will increase these people's tendency to be unwilling to learn from someone else — what Maddock called the "not-invented-here" syndrome.

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Futurist Sights 'People Amplifiers' on Horizon

By Lois Paul

CW Staff

ST. PAUL DE VENCE, France — "People amplifiers — expert software packages — will enable tomorrow's clerk to perform the work of today's professional," Earl Joseph, staff futurist for Sperry Univac, said here recently.

"This does not mean we will need less professionals. We will need more, but the jobs will be different," Joseph added in his presentation on "Systems of the Future" before a group of UK press representatives gathered here for a four-day conference sponsored by Univac.

Joseph predicted an ethnocratic future, combining electronics and ethnic capabilities to amplify their mutual capacity for learning. "In the information age, people amplifiers will bring access to society's knowledge," he said.

Sees Job Increases

When robots are used to displace humans, the total result in society will be job increases, Joseph said. Professionals will become more valuable, he added.

Futurists used to see their roles as doomsday watchers, Joseph said, but now they regard their jobs as that of researching opportunities.

He described the 1980s as the era of "smart machines," which will lead to the 1990s, the era of "macro systems." Chips usually start out in toys, he explained, but eventually these will be put into something useful, such as a projector or refrigerator.

The future computer will be a microcomputer, Joseph said, noting that the new thrust of the U.S. government is to produce very high-speed system integration. "Future systems will evolve with increasing silicon intelligence [high capability in terms of circuitry]," he added.

Regarding the future of artificial intelligence systems, Joseph said that in the last decade we have learned more about how the brain works than in all the time before that.

At long last, there are

things we can put into common everyday devices, such as the automobile and the airplane, he said. He cited an advertising campaign for a microwave oven that tells users they can throw away their cookbooks because the instructions are built into the oven itself.

Pointing to work on medical diagnosis systems at Stanford University, Joseph said: "In the next decade, with

work going on, procedures to make use of a knowledge base could be in the form of a type of calculator."

The medical diagnosis software is an example of a system that lets the user play back in real-time the taxonomy, Joseph said. It involves "teaching the hardware rather than teaching people," he added, noting that the software involves incorporating the knowledge of experts in

a field, as well as an inference capability.

"You can get beyond what is stored in the knowledge base by using heuristics," he said.

Logic Questioned

The audience of science and computer industry journalists strongly questioned Joseph's logic regarding future employment trends with increasing computerization.

At one point Joseph had asked, "If you were the manager of a Detroit automobile manufacturer and it would cost you \$4 per car to computerize assembly operations as opposed to \$20 to employ more people, which would you choose?"

No one chose the latter course and one journalist later asked what would happen to the auto workers displaced by machines.

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Information Center Needs Rein

(Continued from Page 17)
self," Brya asserted.

According to SPCC, the aim of the information center is to allow end users to have direct and immediate access to the information they want, using simple methods and without draining the resources of the DP department.

"Our aim is to get MIS out of the way so that it can concentrate on the things it needs to. In the future, our objective is to have the corporate data base driven by the production functions so that the end user has direct access to the data base. This means that when the user has a DP need he can make his own decisions about which way he wants to go," Brya added.

Significant Benefits

This objective of promoting greater user independence can, Brya said, have significant benefits. These include:

- Lower costs per application because the user can often get the job done more quickly than if he waits for MIS to come up with a solution.
- Increased productivity because there is rapid access to information, allowing both the user and MIS to get more done.
- Management becomes 'problem management' rather than 'symptom management.' By allowing the user to satisfy his own needs and solve his own problems, he is more likely to ask the right questions.

"Through the concept of the information center, we are trying to take away all the traditional barriers that MIS has put up to end users in the past. We are attempting to make the environment such that the user feels comfortable in coming to us," Brya said.

A key concept in the SPCC information center is that the MIS department does not attempt to solve the users' problems for them. Rather, it simply provides guidance and assistance with the user actively participating in finding a solution.

End-user applications being developed through the center include financial planning, major aspects of

corporate training, data retrieval and analysis and time-sharing. Some support in the traditional software languages such as Cobol and assembler is also planned.

At present, SPCC says it has 30 to 40 full-time users of the information center. Each user has a profile specifying items such as what software it used and for what applications. Each user costs the company around \$300 per month in using the center,

which has a total budget of less than \$500,000 per year, he said.

Brya concluded that the successful implementation of an information center depended on the corporate view of data processing. At SPCC, he said, information was regarded as a corporate resource that MIS was obliged to maintain, but does not own. Users must be provided with access to information on their own terms.

Tape History Meet Set

SANTA CLARA, Calif. — The first conference on the history of magnetic recording will be held here Oct. 22-23.

Co sponsored by the University of Santa Clara and the Charles Babbage Institute for the History of Information Processing, the conference will have an industry-wide, international focus, according to its sponsors.

The cost of attending the two-day conference, including two lunches and one dinner, is \$385. Net proceeds from the conference will be donated to the nonprofit Charles Babbage Foundation.

Additional information is available from F. Gordon Smith, Memorex Corp., M/S 12-33, San Tomas at Central Expressway, Santa Clara, Calif. 95052.

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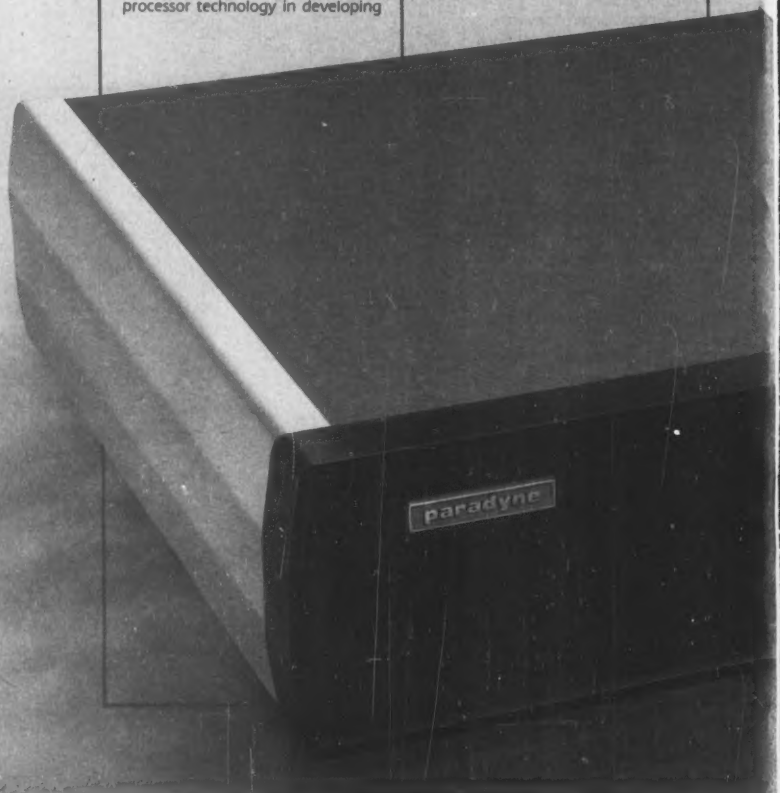
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Keynoters Set for Compcon '81

WASHINGTON, D.C. — The Institute of Electrical and Electronics Engineers' (IEEE) Computer Society has announced two of the keynote speakers for its Compcon Fall '81 conference. The conference will be held here Sept. 14-17.

One of the speakers will be Dr. Richard DeLauer, recently appointed undersecretary of defense for research and engineering for the U.S. Department of Defense and for-

merly executive vice-president of TRW Corp.

DeLauer received his Ph.D. in aeronautics and mathematics from the California Institute of Technology and is the co-author of two books: *Nuclear Rocket Propulsion and Fundamentals of Nuclear Flight*.

Also featured will be Dr. Koji Kobayashi, chairman of the board of Nippon Electric Co., Ltd., Japan. He received his doctorate of engineering

degree from the University of Tokyo and was chairman of the Information Processing Society of Japan from 1968-1970 and from 1979-1981.

Dr. Kobayashi's participation continues the tradition of Japanese contributions to Compcon conferences.

Additional information and advance programs are available from Compcon Fall '81, P.O. Box 639, Silver Spring, Md. 20901.

Data Base Course Out on Cassette

NEWTON, Mass. — A video education series on structured data base analysis and design is available from Eastern Technical Associates, Inc. (ETA).

The course addresses the role of data administration in the data processing organization and attempts to answer such questions as: How does data administration support the application development

team in analysis, design, and implementation?

What specific information does data administration need from the application development team to logically and physically design a data base? How does an organization establish a long-range data base design plan and work toward it?

The lectures are administered by Thomas F. Meurer, president of ETA. The program consists of five cassettes of 45 to 60 minutes each and includes a student handout for each cassette. The licensing fee for the course is \$2,900 plus shipping charges. Further details are available from ETA at 189 Wells Ave., Newton, Mass. 02159.

Sysed Course On CICS Set for Sept. 14

NEW YORK — Sysed, a division of Integrated Computer Software, Inc., is offering a one-day command-level course in CICS on Sept. 14 for programmers experienced in Cobol, PL/I or Assembler languages.

Taught by Robert Blumfeld, director of education for Sysed, the hands-on course will require students to program and test a data entry and file maintenance system made up of four programs.

Since the course gives special attention to such basic on-line concepts as multi-tasking, pseudoconversational programming and screen design, previous exposure to CICS concepts is reportedly not a prerequisite.

The course will be held at Sysed's classroom and computer facilities in New York. Class sizes are limited, so students will be selected on a first-come first-served basis, a spokesman said.

The CICS training course can also be scheduled on-site at a company's installation. Sysed is located at One Park Ave., New York, N.Y. 10016.

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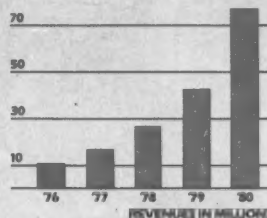
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By Marianna Jones
Special to CW

WALLA WALLA, Wash. — Computer Hal may take over the world, but he won't do it without Tom, Dick or Mary.

Brainpower, not computer power, is the key to making the R2-D2s and the C-3POs of the world serve their purpose, according to Wayne Holt, director of the Office of Computer Services at Whitman College here.

It was creative thinking, for instance, that enabled the college to turn one of its simple computer tools into a versatile system for making graphs that has been exported to computer users throughout the U.S., Europe and Australia.

The system is designed for use with

Hewlett-Packard Co. 3000 series computers and is now available to some 3,000 members of the Hewlett-Packard General Systems Users Group Library, which is headquartered at the college.

Basic Plotter

The project started with a basic HP plotter (HP 7221A), that was capable of producing a four-color graph that would be useful to businesses and other institutions for general-purpose illustrations.

It was a popular in-house tool from the beginning, Holt said, but there were certain drawbacks: Each graph required a written program and the plotter could be used by only one person at a time, using a terminal

linked up to the plotter.

Although Whitman could provide various software aids for creating programs, Holt found that "most students and faculty did not have time to write a program."

"The challenge was to write a program so that a user could simply answer questions about what they wanted their plot to look like instead of writing a program by themselves."

A typical user-computer "conversation" envisioned by Holt might go something like this:

Computer: What do you want me to do?

User: Draw a line.

Computer: What color?

User: Green.

And so on.

Holt turned the problem over to some interested students.

First Breakthrough

The first breakthrough was made by Jason Goertz, who has since graduated from Whitman and is now employed by HP in Bellevue, Wash. In 1978, Goertz developed stand-alone plotting — the plotter could be operated without being attached to a computer terminal.

It took another year, with students working on the project in their spare time, before a break came in the programming element. HP got the ball rolling when the company provided a graphics mock-up package called "Mock," developed for internal use, but not pursued with any vigor.

"Our students dug deep," Holt said. "They found a lot of little problems in the program. They thought of new reasons for new commands."

Mark Douglas, a Whitman student from Richland, Wash., is given credit for developing a program "which had all the things HP had before, and more," according to Holt. It was a simple process for creating the desired graph.

Holt and Douglas decided to call the new software "Smock," an acronym for stand-alone plotting and the original mock-up program.

Smock proved to be a mixed blessing. The system was so easy and convenient to use that access became a problem.

While demand was up, "only one person could plot at a time," Holt said.

First Step

The first step away from the one-man, one-machine problem came when HP provided the college with an automatic paper advance for the plotter. In exchange, Douglas and Holt agreed to work on a way to make the machine accessible to more than one person at a time.

Holt took Smock to a Northwest Regional Users Group (Nowrug) conference in the summer of 1980 for a demonstration that attracted the interest of several other persons, including Rich Bergquist and Steve Cooper of American Management Systems in Foster City, Calif. With some help from these experts, Douglas came up with spooled plotting, which could be used with the HP system.

Spooled plotting bypasses direct input into the plotter by feeding information onto a disk. Now any number

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Improves Basic Plotter

of persons working at separate terminals could all have access to the plotter. When one graph was completed by the plotter, it automatically would begin the next.

Four users, for instance, could now have graphs within 20 minutes. The same four graphs made one-on-one with the plotter would require over an hour's time, Holt says.

The final step to spooled plotting took only a short time when all the pieces of the puzzle were assembled.

"As soon as I saw it was possible, it took only five hours to put into operation," Douglas said. "A few days later, I found one small problem. That took only five minutes to fix."

"All in all, nothing exceptionally technical was involved in the three-year effort" that resulted in Smock and spooled plotting, Holt said. "But the direct involvement of outstanding students with real-world problems made the effort worthwhile."

Low-Key Cooperation

It also illustrates the success possible with low-key cooperation between a computer company and a private college, he said.

"Everyone involved benefits — the company, the students and the users."

At Whitman, real-world experience has paid off, Holt noted. Although computer science occupies only a small part in the curriculum at the small (1,100 students) liberal arts college, students with real interest spend much of their spare time working at activities and training, which many computer science graduates have to get on the job, he asserted.

Martin Returns With Seminar

SANTA MONICA, Calif. — The return of the James Martin World Seminar has been announced by the Technology Transfer Institute, which will host the five-day event in four major cities in the U.S. and Canada this fall.

Martin will provide a synopsis of the DP revolution. His circuit will bring him to Atlanta, Oct. 12-16; Toronto, Oct. 19-23; Boston, Nov. 2-6; and San Francisco, Nov. 16-20.

Martin will touch upon such topics as application development without programmers, network architectures, data base design and corporatewide planning. The five-day course will detail strategies for the management and evolution of these environments.

Senior Management Day

In addition to the five-day seminar, Martin offers a Senior Management Day seminar, which discusses why management must redefine its role. This seminar within a seminar is scheduled for the Monday session of each five-day lecture.

The entire program costs \$1,295, and the Senior Management Day alone costs \$350.

Further details are available from the Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

"We have a limited number of students — about two a year — coming out, but they are in high demand," Holt said. Most go on to high-paying jobs in industry.

Douglas is an example. He already has been recruited, at the end of his junior year, for a computer position with a Washington municipality. In the meantime, he is working on an improved version of Smock, which he calls Painter/3000, and is involved in another project interfacing an outdated terminal so that it may be used with the HP computer.

And why all the fuss about graphics in the first place?

"You have to remember," Holt said, "a picture is worth — as someone once said — 4,822 words."

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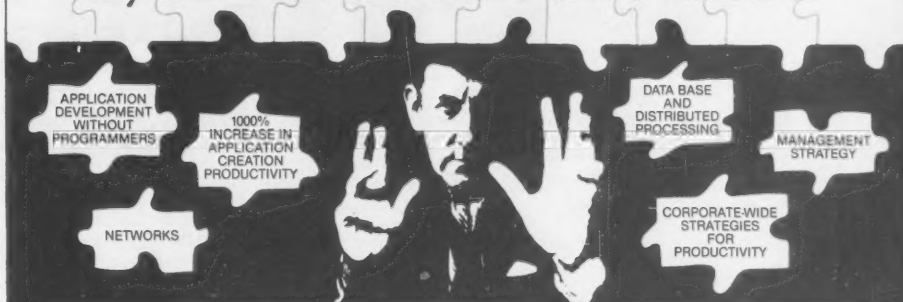
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Atlanta	October 12-16
Toronto	October 19-23
Boston	November 2-6
San Francisco	November 16-20

"The GREAT FALL SEMINAR GIVEAWAY" marks TTI's fifth anniversary and 10,000 Martin attendees. Briefly, this onetime offer enables one student to attend, tuition free, for every ten paid from your company who hear James Martin during the Fall season. For full details, complete the coupon below.

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working, data base control, office-of-the-future integration and information resource management.

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Larry Long's List of Professional Societies

• MICRU INTERNATIONAL

Purpose and Objectives: Micru International is an independent, worldwide, not-for-profit association composed of those who use data processing equipment marketed by the Microdata Corp. and its dealer network. It is a unique organization established for Microdata users to serve their own informational and educational needs.

Micru is a primary source of information about Microdata equipment, its uses and applications. It is the gathering place for technical experts who want to know more about the power and growth of the system.

Some Micru members are technically oriented and others are more applications-oriented.

For More Information: Norwin A. Merens, Managing Director, 4300-L Lincoln Ave., Rolling Meadows, Ill. 60008.

Larry Long is compiling a list of professional DP/Computer societies and organizations. To be included, societies and organizations should send a brief description of their purposes and objectives to Larry Long, Editorial Department, Computerworld, P.O. Box 880, Framingham, Mass. 01701.

• SOCIETY FOR COMPUTER MEDICINE (SCM)

Purpose and Objectives: SCM is a society comprised mostly of physicians

and other medical professionals whose primary purpose is to foster the development and application of medical informatics to improve patient care and the general health of the public.

The membership is composed of physicians, nurses, members of academia, hospital administrators, engineers, computer professionals and students in related fields. Additionally, its members represent certain U.S. corporate, academic, and professional organizations and include members from several countries outside the United States.

Founded in 1971, this educational and non-profit organization publishes a quarterly newsletter, abstracts of papers presented at its annual con-

ferences and periodic bulletins of interest to the health care computer field. Specific goals include the promotion of medical information technology for patient care management, the establishment of standards for computer-compatible medical terminology and guidelines for handling confidential clinical data, to become a clearing house for state-of-the-art information, and to provide a unified representation on national and international medical informatics issues.

For More Information: Lynn Cheezum, Executive Director, Society for Computer Medicine, 9650 Rockville Pike, Bethesda, Md. 20014.

• SOCIETY FOR MANAGEMENT INFORMATION SYSTEMS (SMIS)

Purpose and Objectives: SMIS is a not-for-profit professional society comprised of and operating for managers, educators, researchers and consultants in the field of information resource management.

The objectives of the society are to inform, educate and involve members in the latest developments in the management and technology of the information resource.

SMIS is chartered to foster international recognition of information as a basic organizational resource, and to promote the effective utilization and management of these resources towards the improvement of management performance; promote the highest moral and ethical standards; promote and support SMIS chapters; promote and support research and education leading to a better understanding of the fundamental nature, form, structure, and management of information systems and resources; and identify and evaluate, from a management perspective, existing and emerging practices and technologies.

For More Information: Michael C. Rippey, Executive Director, SMIS, 111 E. Wacker Drive, Chicago, Ill. 60601.

• WOMEN IN INFORMATION PROCESSING (WIP)

Purpose and Objectives: WIP is an international organization of women in the computer, word processing and related disciplines. The purpose of the organization is to advance the information processing industry by helping women benefit from opportunities created by automation, whether they work within the industry or work for end users, and by attracting additional qualified women to the industry.

One of WIP's main emphases is to help women build professional contacts more quickly by arranging ways to introduce women in the industry through four complementary and constantly expanding spheres of influence: networks, seminars, affiliated groups and *Parity* magazine.

The WIP Speakers Bureau coordinates cooperative efforts with other groups, both inside and outside the industry, bringing regular opportunities for forum members to speak and help arrange product demonstrations and exhibits.

For More Information: Janice Miller, WIP National Headquarters, Suite 9, 1000 Connecticut Ave., N.W., Washington, D.C. 20036.

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| <input type="checkbox"/> General Ledger | <input type="checkbox"/> Professional Time and Billing |
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DIBOL-8 packages for PDP-8, 7B/88 Series:

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| <input type="checkbox"/> Order Entry/Billing | <input type="checkbox"/> Accountants' Client Write-Up |
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Digital Equipment Corp. — Manufacturing Software

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Texas Instruments — Accounting Software

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*These packages are currently in development. Inquire for detailed information regarding completion schedules.

If you would like to receive more information about any MCBA application, please contact our Sales Department at:

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Are Women DPer Underpaid?

Q The letter from the woman DP manager who was single-handedly running her firm's entire DP operation without being organizationally recognized as equal to the other department heads was an extreme example of the kind of problem faced by many women in DP. Your answer, I felt, was incomplete; you told her that she was right in her feelings, but neglected to offer a concrete course of action.

This woman is very clearly being taken advantage of by her supervisors. Unless her firm is very small and located in a salary-depressed area of the country, she is being underpaid by at least \$5,000 to \$8,000 (my boss concurs with this opinion).

Moreover, it does not seem that upper management has any intention of remedying this. The fact that it has been stalling her career path queries for more than a year and that she has no backup are evidence enough.

The strategy that I offer is three-pronged. Step One is to obtain an adequate backup person if at all possible. It is beyond all reason for her to be expected to be on 24-hour call; besides, there is the business adage that "to be indispensable is to be unpromotable."

It is quite possible that she will encounter resistance to Step One from upper management. However, after an appropriate length of time (about six months), Step Two may be implemented with or without the success of Step One.

Step Two is paraphrased from an article: "Sudden sartorial splendor, coupled with a number of long lunch hours, dental appointments and so on . . . is a sure way of making management sit up and take notice. They will take some action if they do not want to lose a valuable employee."

This is not using indispensability as a lever; it is merely making a clear statement that the old reliable doormat won't be around forever. Since she states that she has considerable schedule freedom, this should be a very easy step to implement.

If Step Two is unsuccessful, or if she senses that management will fire her for having the temerity to ask for her due, it may be necessary to go to Step Three: change jobs. She is not "looking for greener pastures" to get out of a situation that yields low benefits and high frustration.

She might be surprised by how far her level of experience can take her with a company whose attitudes are neither exploitive nor stuck in the 1930s.

I hope that this will give her some ideas on possible solutions to her problem.

A She initially asked for a confirmation of her assessment of the situation. I concurred and offered some supporting statements.

Although I don't necessarily concur, she and others with the same plight might find your recommended course of action helpful. Read on

for another alternative.

Q To the author of the letter "When Does a One-Person Operations Manager Merit Executive Management Status?" I would recommend:

1. Make regular written summaries of your accomplishments (that is, increased profits, efficiency, productivity; or, reduced costly errors, staff positions and so on) and send them as status reports to appropriate persons.

2. Act like you belong in management's camp. Make recommendations without waiting for requests for your opinion.

3. Several months before your

next performance review, schedule a meeting with your boss to review your work and get his recommendations for future goals and so on. Let him know you expect an increase based on your corporate contributions. If the title of manager and associated prerequisites are important to you, ask for them both.

4. Begin interacting with other professionals to keep abreast of job opportunities and to boost your self-confidence to ask for what you want.

5. Be prepared to use your leverage if your boss turns a deaf ear. Leave; it will be to your advantage to find a more receptive work environment.

Turnaround Time

By Larry E. Long



A All are good recommendations, but unless they are executed carefully, some may backfire.

Long is a professor at Lehigh University, a DP consultant and author.

Have a question? Send it to Larry Long, Editorial Department, Computerworld, P.O. Box 880, Framingham, Mass. 01701.

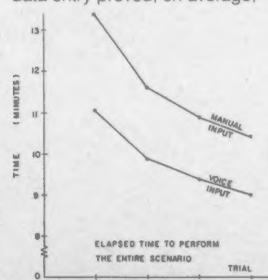
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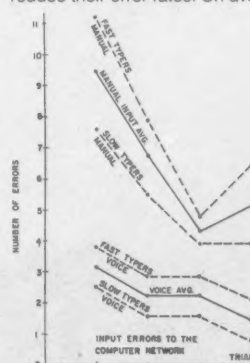
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*Using Voice Input to Operate a Distributed Computer Network. Gary K. Poock, Ph.D. Professor of Operations Research and Man-Machine Systems, Naval Postgraduate School, Monterey, California. April 4, 1980.

Fall Computer Expos Set For Small System Users

FRAMINGHAM, Mass. — The Interface Group will present four regional Computer Showcase Expos in the fall for users of business, professional and personal small computer systems.

The Expos are scheduled to take place at Pier 92 Passenger Terminal in New York City, Sept. 17-19; Brooks Hall in San Francisco, Oct. 21-23;

Miami Expo/Center in Miami, Oct. 30 to Nov. 1; and at the Convention Center, Los Angeles, Nov. 13-15, a spokesman said.

Further information on the Showcase expositions is available from Peter B. Young or Joan Hendrickson at the Interface Group, 160 Speen St., Framingham, Mass. 01701.

Sept. 30 Through Oct. 2

NIMR Plans Data Systems Meet

LOS ANGELES — "Information Systems: The New Generation" is the theme of a three-day conference to be presented here Sept. 30 through Oct. 2 by the National Institute for Management Research (NIMR).

The conference will cover the application of new computer equipment, software, communications approaches and management technolo-

gies. Included also will be an examination of latest innovations and methods, and a study of successful case histories in financial information systems.

Keynote speakers at the meeting will include Richard K. Davis, vice-president at Performance Development Corp.; Robert Greco, director of information resources management at McDonnell

Douglas Automation Co.; Ed Hibsman, manager of systems and analysis for Management Systems at TRW-Electronic and Defense Systems; Dennis R. Hykes, general manager of financial planning at Control Data Corp.; and Michael E. McCorry, vice-president at Qantel Corp.

A 1000-page conference notebook containing speaker presentations and extensive reference material is handed out to all attendees.

The cost of the conference is \$495, including lunch on Monday and Tuesday. Additional information is available from Department PR, NIMR Seminars, P.O. Box 3727, Santa Monica, Calif. 90403.

HCR Seminars To Focus On Bell's Unix

TORONTO — Human Computing Resources Corp. (HCR) will hold a series of two-day introductory seminars beginning next month here and in three major U.S. cities focusing on Bell Laboratories' Unix operating system.

Aimed at software managers, consultants, analysts and programmers, the courses will cover Unix philosophy, files, programming, program maintenance and text processing. The seminars will also discuss many Unix features including its tree-structured file design, ability to initiate asynchronous processes and its flexible command language.

Course Schedule

The courses will be held here on Aug. 26-27 and Nov. 4-5; in Boston on Sept. 23-24; in San Francisco on Oct. 14-15; and in Washington, D.C., on Dec. 2-3. The seminars will be taught by Michael D. Tilson, vice-president of HCR, and Stephen Pozgaj, a senior consultant with the Canadian-based firm.

The registration fee is \$425. More information on the courses and HCR can be obtained from the firm at 10 Mary St., Toronto, Ont. M4Y 1P9.

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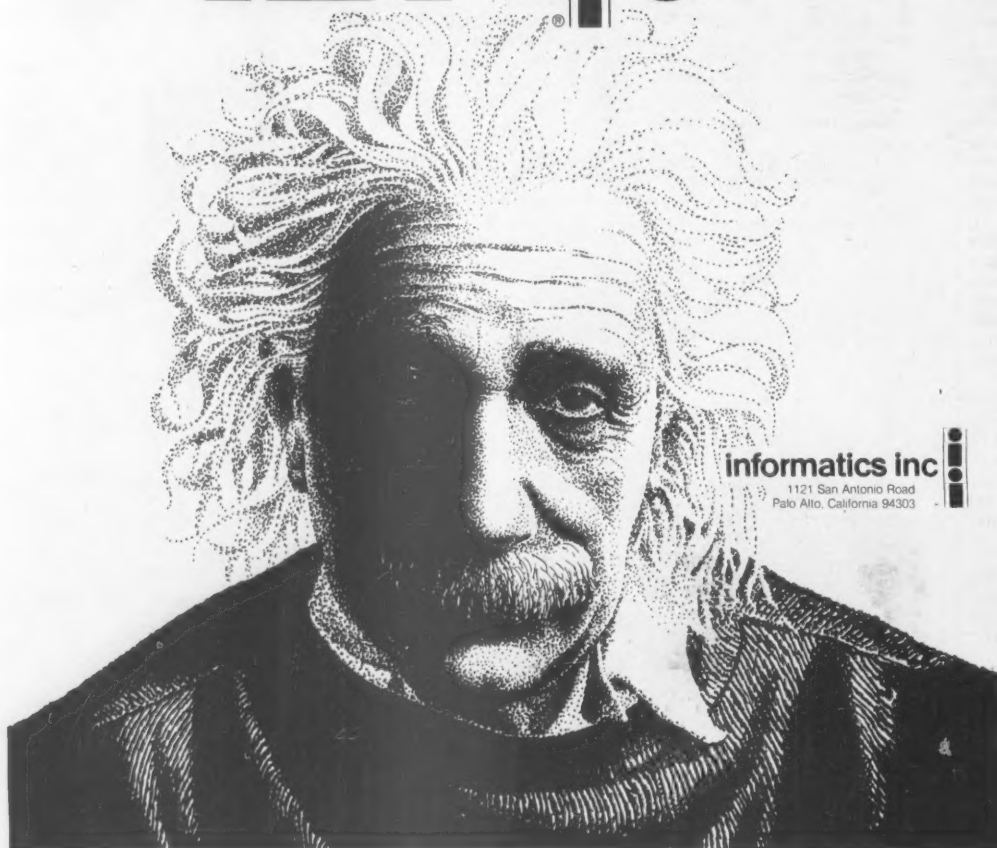
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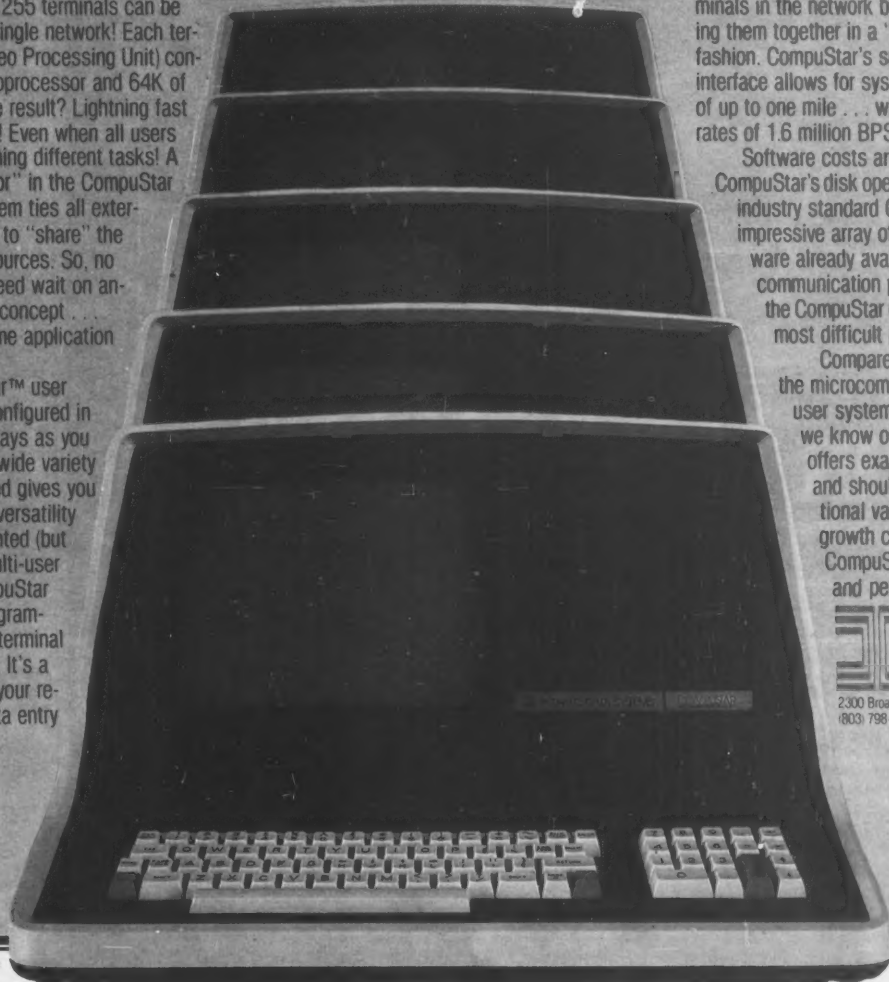
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Aug. 26-28, Asheville, N.C. — **How to Build and Use a Data and Information Resources Directory.** Contact: Information Resources Management Associates, Inc., P.O. Box 40795, Washington, D.C. 20016.

Aug. 31-Sept. 2, College Park, Md. — **Justification, Evaluation and Implementation of CAD/CAM Systems.** Contact: Professional Continuing Education

Courses, University of Maryland University College, Center of Adult Education, College Park, Md. 20742.

Sept. 1-3, Atlanta — **Computerized Office Equipment Expo/Southeast '81.** Contact: Janet Schafer, Cahners Exposition Group, 222 W. Adams St., Chicago, Ill. 60606.

Sept. 2-4, Washington, D.C. — **Computer Communication Systems and Networks.** Contact: Director, Continu-

ing Engineering Education, George Washington University, Washington, D.C. 20052.

Sept. 3-4, San Francisco — **In-House Consulting Skills for Systems Analysts.** Contact: Registrar, 14th Floor, University Conference Center, 360 Lexington Ave., New York, N.Y. 10017.

Sept. 8-10, Washington, D.C. — **1981 Government Micrographics Conference**

and Exposition. Contact: National Trade Productions, Inc., Suite 300, 9301 Annapolis Road, Lanham, Md. 20801.

Sept. 9, Newton, Mass. — **Necom '81.** Contact: Carol L. Reimer, Norm De Nardi Enterprises, 95 Main St., Los Altos, Calif. 94022.

Sept. 9, Sturbridge, Mass. — **Office Systems-Alternatives in the Eighties.** Contact: Better Word Technology, P.O. Box 515, Tnpk. Station,

Shrewsbury, Mass. 01545. Also being held Sept. 23 in Marlboro, Mass.

Sept. 9-11, San Francisco — **ASP-ACSM Fall Technical Meeting.** Contact: 1981 ASP/ACSM Fall Technical Meeting, U.S. Geological Survey, 345 Middlefield Road, M/S 32, Menlo Park, Calif. 94025. Also being held Sept. 14-16 in Honolulu, Hawaii.

Sept. 9-11, Chicago — **Strategies for Implementation.** Contact: Conference Manager, U.S. Professional Development Institute, 12611 Daven Drive, Silver Springs, Md. 20904.

Sept. 9-11, Boston — **Data Communications Systems: A Short Course.** Contact: American Institute for Professional Education, Carnegie Bldg., 100 Kings Road, Madison, N.J. 07940. Also being held Sept. 16-18 in Houston.

Sept. 9-11, New York — **Corporate Electronic Funds Transfer Conference.** Contact: Sheila M. de Valia, Suite 800, EFT Association, 1029 Vermont Ave. N.W., Washington, D.C. 20005.

Sept. 9-12, Santa Clara, Calif. — **Workshop on Pascal and Programming Technique.** Contact: Continuing Education in Engineering, University of California Extension, 2223 Fulton St., Berkeley, Calif. 94720.

Sept. 10-11, San Diego, Calif. — **Simulation: Tools and Techniques Conference.** Contact: Lilli Alcalá, Conference Registrar, Caci, 12011 San Vicente Blvd., Los Angeles, Calif. 90049.

Sept. 10-11, Chicago — **Office Automation Systems.** Contact: Architecture Technology Corp., P.O. Box 24344, Minneapolis, Minn. 55424.

Sept. 10, St. Louis — **Stradis-Management Overview of Structured Systems Development Methodology.** Contact: George Blatt, Department K277, P.O. Box 516, St. Louis, Mo. 63166. Also being held Sept. 11 in Minneapolis, Sept. 15 in Boston, Sept. 21 in Atlanta, Sept. 23 in Detroit and Sept. 25 in Denver.

Sept. 10-11, Washington, D.C. — **The Computer-Micrographics Interface: Com and Car.** Contact: Continuing Engineering Education, George Washington University, Washington, D.C. 20052.

Sept. 10-13, Chicago — **Mid-West Computer Show.** Contact: National Computer Shows, 824 Boylston St., Chestnut Hill, Mass. 02167.

Sept. 13-15, Carmel, Calif. — **Multifunction Work Stations.** Contact: Richard D. Murray, Director of Conferences, Institute for Graphic Communication, 375 Com-



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monwealth Ave., Boston, Mass. 02115.

Sept. 13-16, Copenhagen, Denmark — **International Micrographic Congress.** Contact: Don Avedon, International Micrographic Congress, P.O. Box 34146, Washington, D.C. 20034.

Sept. 13-16, Houston — **Financial Industries Users Conference.** Contact: Bruce Jaster, University Computing Co., UCC Tower, Exchange Park, Dallas, Texas 75235.

Sept. 14-15, Seattle, Wash. — **Software Cost Estimating.** Contact: Data Processing Management Association, Education Foundation, P.O. Box 91295, Department SCE, Los Angeles, Calif. 90009. Also being held Sept. 17-18 in San Francisco.

Sept. 14-15, Boston — **Structured Methodology For Software Design and Development.** Contact: Data Processing Management Association, Education Foundation, P.O. Box 91295, Department SM/SDD, Los Angeles, Calif. 90009. Also being held Sept. 21-22 in Washington, D.C.

Sept. 14-15, Chicago — **Computer Graphics.** Contact: Data Processing Management Association, Education Foundation, Department CG, P.O. Box 91295, Los Angeles, Calif. 90009. Also being held Sept. 17-18 in Boston.

Sept. 14-16, New York — **Data Communications Seminar.** Contact: McGraw-Hill Conference Center, Suite 3677, 1221 Ave. of the Americas, New York, N.Y. 10020.

Sept. 14-16, Washington, D.C. — **Facilities for Auditing IBM's DOS/VS Operating System.** Contact: MIS Associates, 12 Juniper Lane, Framingham, Mass. 01701.

Sept. 14-16, Washington, D.C. — **Audit and Security Concepts for IBM's Operating Systems.** Contact: MIS Associates, 12 Juniper Lane, Framingham, Mass. 01701.

Sept. 14-16, Toronto — **Auditing & Controls for On-Line Systems-I.** Contact: MIS Associates, 12 Juniper Lane, Framingham, Mass. 01701.

Sept. 14-16, Toronto — **Auditing & Controls for On-Line Systems-II.** Contact:

MIS Associates, 12 Juniper Lane, Framingham, Mass. 01701.

Sept. 14-16, Toronto — **Audit & Control Concepts for IMS.** Contact: MIS Associates, 12 Juniper Lane, Framingham, Mass. 01701.

Sept. 14-16, Las Vegas — **Fifth Annual Data Entry Management Conference & Exhibit.** Contact: Marilyn S. Bodek, Data Entry Management Association, P.O. Box

3231, Stamford, Conn. 06905.

Sept. 14-16, New York — **Structured Systems Analysis, Design and Programming.** Contact: Joe Menendez, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held Sept. 21-23 in San Francisco.

Sept. 14-16, Boston — **Improved Automated Payroll Systems.** Contact: American Management Associations,

135 W. 50th St., New York, N.Y. 10020.

Sept. 14-17, Los Angeles — **Intelepo-81 Technical Program Summary.** Contact: U.S. Telecommunications Suppliers Association, Suite 1618, 333 N. Michigan Ave., Chicago, Ill. 60601.

Sept. 14-17, Washington, D.C. — **Productivity-an Urgent Priority.** Contact: Compcon Fall 81, P.O. Box 639, Silver Spring, Md.

20901.

Sept. 14-18, New York — **CICS-Command Level Course.** Contact: SysEd, One Park Ave., New York, N.Y. 10016.

Sept. 14-18, Boston — **The Information Engineering Revolution.** Contact: Jill Hyman, Information Methods Corp., Suite 1451, 10 Milk St., Boston, Mass. 02108. Also being held Sept. 28-Oct. 2 in New York.

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EDITORIAL

The Big Lie

The State Department is about to be caught in a lie. While this might not be unusual for an agency accustomed to peddling the polite half-truths and distortions that are so often the staple of international diplomacy, the department this time is about to be caught in "the big lie."

"The big lie," as we all know, is an improbable story that, trumpeted loudly and long enough, gains some measure of credibility. The big lie in this case is the department's assertion before a number of international forums that U.S. multinational corporations really are concerned about protecting the personal privacy of employees and customers.

For several years, U.S. representatives have been spreading this falsehood with great vigor, trying to persuade other countries not to pass laws restricting the transmission and processing of automated personal data.

This transborder data flow debate has intensified in the last few years, with a number of countries, primarily our major European trading partners, arguing personal data should not be transmitted out of their countries to third nations, such as the U.S., unless those nations can guarantee privacy protection equal to those of the home country.

Since the U.S. has little in the way of privacy legislation, and nothing that corresponds to the omnibus statutes arising in many European nations, this prospect has understandably troubled American multinationals whose overseas operations rely to a great extent on the free movement of data from one country to another.

Reacting to those concerns, State has sought to ensure our privacy-frenzied friends abroad that the U.S. does not have equivalent omnibus privacy laws because we make laws only to attack specific problems and that we are moving slowly but surely to take up privacy matters.

Meanwhile, the U.S. representatives have said, there is no reason to fear U.S. multinationals because any personal data transmitted to the U.S. or by U.S. companies overseas will receive zealous safeguarding by the corporate hierarchy.

This is not an assertion that has received widespread credence around the world. However, largely on the strength of this argument, the State Department did successfully negotiate a set of voluntary privacy guidelines in the Organization for Economic Cooperation and Development (OECD), to which the U.S. belongs. The OECD gave members about a year to prove they would honor those principles.

Come October, the organization will meet in Paris and review the extent of the guidelines implementation.

For the U.S., unless something changes in a hurry, the State Department will have little to say at that meeting.

During the last days of the Carter administration, the Commerce Department sent letters to 750 corporations asking them to visibly demonstrate acceptance of the privacy guidelines.

By the beginning of July, only 25 companies had done so. Now the Reagan administration is trying its hand, through another mailing from Commerce's National Telecommunications and Information Administration.

The outlook is not good, however, and the Commerce and State Departments are clearly troubled. The officials were surprised when several representatives of corporations and trade associations said many companies do not want anything to do with the guidelines. Many firms, it seems, feel they can accommodate their international operations to individual national privacy statutes around the world and see no reason to increase their liability to privacy suits by their American workers and customers.

It is hard to argue with that reasoning unless one points out, as State is desperately trying to do, that privacy guidelines negotiations were just the first part of a long-range OECD project already into its next phase — studying the economic and legal aspects of transborder data flows.

The barriers to data transmission and processing that might result from these deliberations of a relatively friendly international body are truly frightening to U.S. representatives. And that's just the good news. Third World countries are even now considering privacy principles that include data regulation and taxation proposals so draconian they leave U.S. corporate executives wondering whether to laugh or cry.

State recently promised Congress it will diligently represent U.S. interests in international discussions. However, many here are wondering how much help U.S. firms can expect from the department if it ends up with egg on its face after working so hard for the OECD guidelines.

The department's European counterparts have said all along, mostly in private, that when it really came down to it, there was no way U.S. corporations would adopt these guidelines.

The U.S. has little time to prove them wrong and refute this big lie about U.S. concern for personal privacy in the computer age. State Department officials, aware the matter is largely out of their hands, are waiting to hear from these corporations that started the lie in the first place.

DATA PAST

Five Years Ago August 2, 1976

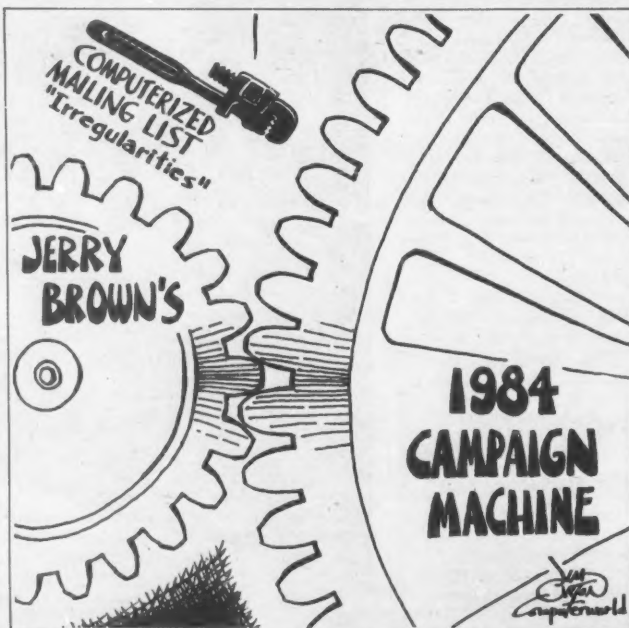
CAMBRIDGE, Mass. — More than half the consumers questioned in a survey here were opposed to the AT&T-conceived Consumer Communications Reform Act. The public response was part of a random survey conducted by The Yankee Group. About 55% of the consumers said they were opposed to the legislation then pending in various versions before both houses of Congress.

Ten Years Ago August 4, 1971

WASHINGTON, D.C. — The Post Office Department's computerized management information system (MIS) was shown to cost more and be less useful than previous manual systems, according to the General Accounting Office (GAO). The GAO reported that inadequate planning,

insufficient testing and excessive haste resulted in a system that was more than two years late, cost \$60 million, required more rather than fewer people, had "substantially increased costs," a high error rate and produced useless reports.

CHICAGO — The computer profession celebrated ACM '71, the observance of the 25th anniversary of computers. The annual convention of the Association for Computing Machinery was expected to draw more than 1,000 attendees, considered a "tribute" to the dedication of programmers and managers whose companies were not paying expenses because of budget problems, an ACM official suggested. "The Quarter Century View" was expected to be one of the most well-attended features of the meeting. Mayor Richard Daley proclaimed this "Computer Quarter Century Week."



THE TAYLOR REPORT/Alan Taylor

MUG's Business Unfinished

The Mumps User Group (MUG) normally meets once a year. The 1981 meeting is over and all serious matters have now been put off until 1982. Unfortunately, this situation is leaving the patients in more than 100 Veteran's Administration (VA) hospitals without benefit of computers. In the meantime, both unused computers and necessary programs are waiting and available, but the "owner" of the hospitals, the VA, is trying, for its own reasons, to ignore them.

It would be easy to write a column blasting the VA and, in particular, its Office of Data Management and Telecommunications. Both the history of VA computerization, with an apparently unfought dependence upon a single hardware vendor — Honeywell, Inc. — and the apparent future indeed cry out for a number of columns on the subject.

It is also comparatively easy to write about the way the VA is attempting to hide the continued use and availability of Dr. Chase's decentralized systems, both internally and through mere neglect. Both subjects would be factually and technically interesting and perhaps will deserve space in the future.

But neither would really hit today's need. Nothing would change if they were published. No continued and informed action plan would result and the impact, at best, might perhaps reduce the lead time to having those hospitals computerized brought down to five years from the

present 10!

From my talks with VA hospital representatives and others over the past few weeks, one thing seems apparent. It would be possible to have at least half of the hospitals actually computerized within the year remaining before the next MUG meeting. This could be achieved with the currently available \$800,000, with the unused computers and so-called word processors and with the programs — both ready to be used and those that are to be further developed — that are to be found in just about every part of the country.

Moreover, I believe the MUG authorities know this and also know that, if nothing breaks the current stalemate at the agency this year, most hospitals will continue uncomputerized while a large, centrally dominated and technically obsolete system unavoidably will be on its way up the bureaucratic ladder.

Under these circumstances, the actions of the 1981 MUG meeting in urging individual people to make waves is little better than an evasion of responsibility.

Success Not Certain

True, success of concerted MUG action cannot be guaranteed. Indeed, I would go further and at this stage give it less than a 25% chance of heading off the next VA computer scandal or of having the current oversight group of the Office of

(Continued on Page 35)

HUMAN CONNECTION/Jack Stone

Users, DPers Suffer Communication Problem

A large number of users — at least among those I know — express the opinion that, assuming proper training, there is every reason why they would expect to develop the skills required to relate effectively to computer systems.

But most of these users also say they shy away from information systems projects because of past failures with the data processing department, failures they say have been well-demonstrated in a wide variety of situations. These lapses are attributed to DPers' insensitivity to critically important user needs for a social infrastructure, upon which users expect information systems to be planned, developed and implemented.

And the users go on to say that, too often, DPers violate fundamental precepts in dealing with users.

Problems and Comments

In this article, another in my sometimes series on pragmatic social psychology in the computer center, I provide several generalizations about what many of my user friends had to say on this subject, and I add some guidance that I hope may be helpful.

Example: Some DPers rarely send out the 'word' when changes are instituted. The users I talked with did not seem to be overly demanding; rather, they were only asking to be kept informed of such changes on a reasonably timely basis.

Comment: DPers must be hypersensitive to the needs of users for regular, concise and clear communications about the status of systems plans.

Example: At installation time, DP installers are frequently forced to contend with an unending stream of software bugs.

Although these DPers exhibit considerable pride — and technical expertise — in solving software problems in what amounts to a "pressure-cooker" environment, the users look aghast upon these occurrences, wondering:

- Why the installer could not explain in one-syllable terms just what the problem was and how it could be handled should it recur in the future.

- Why the software was released in the first place.

- If the next release will have more bugs added than are removed.

- What unknown systems misfortunes will befall them after the technical "geniuses" return to their lairs for further introspection.

Comment: System failures at installation times tend to undermine the confidence of the users, so much so in some cases that the installers are not invited back. Restating an old but still valid theme: When will the large system developers learn what the microsystems suppliers have known for some years now — it would be easier to gain user acceptance.

(Continued on Page 34)

READER COMMENTARY/Kenneth T. Orr

After 25 Years, Software Still a Mystery

It seemed a little incongruous. There was the Space Shuttle, multi-billion piece of gleaming hardware sitting there unable to take off because of a software error. One computer, it seemed, couldn't talk to another.

All in all, it wasn't too unusual for problems to pop up in a new program. What was amazing, however, was the fact that none of the announcers on any of the news programs I flipped to had even the slightest idea what the cause of the problem, "software," meant.

Talk about an image problem. After more than 25 years, software is still a mystery to most people. Unhappily, "most people" includes nearly all top managers and a great many data processing managers as well.

Part of the problem people have in understanding software is that its tangible form is so unremarkable. It is difficult to imagine, when looking at a stack of listings, that those listings embody a product as complicated as an airplane or an automobile or a modern office building.

Image Problem

Software also suffers from an image problem because of the difference between toy systems and industrial-

grade systems. Everyone understands the difference between a tricycle and a truck, or a child's playhouse and a skyscraper. However, it is much more difficult to "see" the difference between a Basic program written by an amateur programmer for his own use and an industrial-grade, on-line processing system that must handle hundreds of thousands of transactions and be used by hundreds of people.

Over the last 25 years the engineering of software has come quite a long way, but because of the failure to explain the very nature of the business, many organizations are continuing to make the same kinds of mistakes in managing software that they were making 10 or 20 years ago.

Because it is not well understood, the management of software is subject to a great many fads. We have seen large organizations engaged in a wide variety of "ultimate solutions": higher level languages, operating systems, total management information systems, data base management, distributed processing and, now, information resource management "user-friendly systems" and systems methodologies.

Each approach proposed to end forever the "software problem." But

that problem, like the common cold and the cockroach, persists despite efforts to eliminate it. Why?

In order to solve a problem, you have to treat the disease, not simply the symptoms. Most people look at software or, more correctly, a software system as a short-term phenomenon. We simply think in much too short time frames. For years, managers have been told that systems only last for one-and-a-half to three years. While this may be true for toy systems, for the major industrial-grade systems, the time spans are more like 20 or 30 years as a minimum.

Accounts receivable, accounts payable, payroll, inventory, manufacturing, marketing and general ledger are all mainline systems that will be with us no matter what. Today, most major corporations have large-scale operations containing thousands, perhaps tens of thousands, of programs whose cost to develop is valued in millions, even billions, of dollars. The degree of engineering involved in these thousands of programs varies from the ridiculous to the sublime.

What has been called the "software problem" is really several problems:

- The development of software.
- The maintenance of software.

- The quality and flexibility of the information upon which the organization runs.

Because of the intangible nature of software and information and because of the rapidly changing nature of computer hardware, it has been easy to overlook the necessity for long-range planning and careful engineering of information systems quality.

Poor Decisions

As a result, we spend \$2 in software maintenance for every \$1 of development cost. But, more importantly, billions more are spent because of poor decisions made on poor data.

In most billion-dollar industries, management would not think of trusting major engineering decisions to amateurs, no matter how gifted. Unfortunately, this is not true of software engineering. Invariably, there is serious discussion of "user-developed systems" and "heuristic development," as if such activity were possible, much less desirable.

User involvement is a critical element of any good information system, just as it is in any good aircraft system or communications system or highway system. However, it is not

(Continued on Page 34)

Wrong Operating System

I was distressed to read in your report on the IBM Series/1 "IBM Series/1 Test Snags Preclude Comparisons" [CW, June 15] that "Two operating systems are offered with the Series/1." This statement is incorrect in that it omits an operating system and, in so doing, omits a Cobol subsystem that I guarantee would have run your programs correctly. This Cobol makes EDX Cobol look like something out of a Crackerjack box.

The operating system I refer to is Control Program Support (CPS). CPS was the first operating system IBM offered for the Series/1. CPS is a tight, efficient, multiprogramming system that takes full advantage of the powerful Series/1 architecture.

The Cobol subsystem mentioned is CPS Virtual Cobol. Virtual Cobol al-

lows programs more than 2M bytes in size to execute concurrently in partitions ranging from 6K- to 32K bytes of real memory. In addition, extended storage processing allows concurrently executing applications to bid for additional real storage outside partition boundaries from a free real memory pool — further enhancing performance.

The CPS Cobol instruction set does not support the COMPUTE verb or the CORRESPONDING option, while EDX Cobol supports both of these. However, CPS does support the powerful compound/complex logic operators AND, OR and NOT in relational expressions, which are not supported under EDX Cobol.

LETTERS

We have three Series/1 systems using CPS Virtual Cobol. We used EDX Cobol on one of these systems for a time under EDX Version 3. In more than two years, I have received only a handful of error correcting patches from IBM against CPS and Virtual Cobol. In the last six months, I have received a stack of diskettes and paperwork almost two-feet tall consisting of nothing but IBM-issued error corrections and corrections to corrections for EDX! EDX is a joke. The Series/1 with the right operating system/application software is a powerful, versatile problem solver.

As for the claim made in the article that IBM refused to assist in solving the problems with EDX Cobol — I

contacted an acquaintance at IBM's Boca Raton, Fla., lab (where the Series/1 is supported) who claims no one in the EDX support center was contacted for assistance. If you called some flake at a local IBM branch office with a Series/1 problem, I am not surprised you didn't receive any help. Boca Raton is the place to direct Series/1 questions and problems.

We are sold on the Series/1. Please don't turn others off solely because EDX, only one of three operating systems, is a piece of trash.

Timothy M. Pearson
Pearson Roux & Co.

Joplin, Mo.

Issues in DBMS

In "Choosing the Right DBMS for Your Application" [CW, June 29], Michael M. Gorman has identified data independence and performance as the issues that will dominate discussions about data base management systems (DBMS) in the 1980s.

However, he does not seem to realize that data independence and performance improvements will be accomplished in the storage management function, not in the data management function.

The user should not need to "know" the storage structure to use a DBMS effectively. By decoupling the data management and storage management functions, a data administrator can choose the "best" storage structures. As requirements change, storage structures can be changed and the changes will be totally transparent to the user.

The theoretical foundation for achieving this transparency is Extended Set Theory, as developed by D.L. Childs. He has shown that all the storage structures (hierarchy, network, relations, B-trees) and their associated operations can be mapped into sets and set operations. Therefore, applications can issue requests for sets of data and the storage management function can then issue the appropriate set operations commands to retrieve the data.

This effectively decouples the data from the application, allowing for more independence and pushes the performance question into the hands of the storage management function.

In *Industry Measures*, March-April
(Continued on Page 35)

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After 25 Years, Software Still a Mystery

(Continued from Page 31)

very likely amateurs are apt to build systems that produce correct answers under all conditions, are efficient to operate, are easy to maintain and contain proper recovery and security measures.

In short, short-term fixes are not apt to solve the "software problem." In fact, it is likely that uncritical adoption of these new approaches will make the situation even worse by the end of this decade.

Top management and DP management need to be educated. Short-term fixes don't work. Software, though intangible, is a product. As such, the normal engineering life cycle

applies (see Figure 1).

In the past 15 years software engineering has matured dramatically. Major technological areas such as structured systems design, data base design, cybernetics and ergonomics have come together to aid in the development of a systematic, scientific base for engineering software.

As understanding of the products and processes of software engineering evolves, it becomes possible to develop training, tools, and automation to help the software engineer. Computer-aided systems/data base design (CAS/DBD) is just around the corner.

In the next few years, software en-

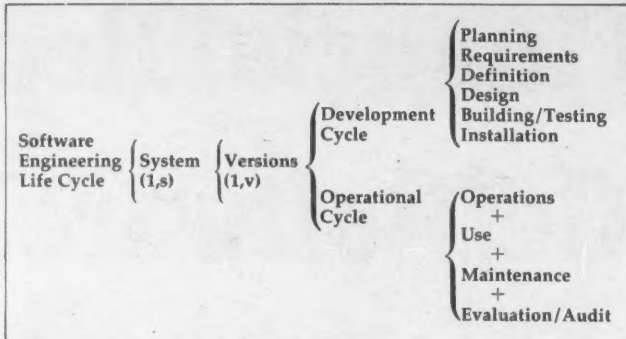


Figure 1

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gineering will be increasingly important to more organizations. As more products become dependent upon software for function and flexibility, top managers will become more involved in the software process. Already, major industries are heavily dependent upon microcoded software. This group will expand dramatically in the next few years.

Continuing Evolution

In management information systems, bigger and more complex systems will continue to evolve. Office automation will bring a dramatic increase in the need for quality systems. Understanding software engineering may become critical by the 1990s. As products, management and production all become electronic, those that master the art and science of building quality software hold the future in their hands.

Those who view software engineering as a peripheral activity will find little solace in the fact that the major winners of the last decade of industrial competition, the Japanese, are currently making major investments in improving software. Based on their track record, it would seem unwise to underestimate their efforts.

With any discipline, there is a ten-

dency to overestimate the short-term effects and underestimate the long-term impact of a new technology. This is surely the case with software technology. It takes a long time for the state of the art to make it into both the educational system and standard practice. In fact, the knowledge of the early 1970s is only now making its way into the college curriculum — and it has not even penetrated most organizations.

And while the first generation of software engineering is only now taking hold, second and third generations of software engineering knowledge are becoming evident. Developments such as structured data base design, structured requirements definition model systems/program design, entity/transaction/event data bases and others are having major impacts.

Who knows? By 1990 even newscasters may understand what software is!

Orr is president of Ken Orr and Associates, Inc. and is the author of Structured Systems Development and Structured Requirements Definition.

DPers Don't Communicate

(Continued from Page 31)

tance if software were delivered that worked the first time it was released — not 21 or so releases later.

Example: Some users pointed out that post-installation operations were so unfavorable they were concerned that the DP department was "out to get them" or "planning to torpedo the user departments."

Comment: Bill Delaney, president of Analysis and Computer Systems of Bedford, Mass., had these comments on the subject in his recent letter to me:

"If you add up the evil done by evil people and compare it against the evil resulting from well-intentioned incompetence, there is no comparison... evil people [make up] a very small proportion of the total.

"Since the well-intentioned tend to be readily forgiven and not disciplined, they remain in place and tend to repeat similar mistakes...

"You can't cut the head off someone who is honestly trying to help and inadvertently erases a costly data base that takes months to create. [The point is that] creative incompetence can get by your most ingenious safety procedures and road blocks."

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Mumps User Group's Work Still Unfinished

(Continued from Page 31)

Management and Budget, with its Circular 109A, left in even a nominal checking role. I do not underestimate the agency's clout.

However, the facts require exposure and because of their technical novelty — even to trained computer programmers and analysts — the very act of forcing them effectively into the open will help MUG members, the DP profession and the patients. (Some of these patients recently went on a hunger strike in protest about conditions generally, which indicates some sort of concern.)

Important Issues

What are the facts that should be exposed? In these days, money waste is naturally one of them. Time waste — in delaying the time when the hospitals are computerized — is another. It is very nice to say some columnist estimates the really necessary time period as less than a year, but the provision of a technically and fi-

nancially sound proposal properly laid out by the MUG consultants would be a lot more persuasive.

It is also very nice to say that the data base package is working in San Francisco (as I have found that it is), or that it has been working for more than a year without programmers, or that it has been successfully transported to other hospitals. All of this is true. But how about actually gathering the systems from such sites as Birmingham, Ala.; Oklahoma City, Okla.; and Washington, D.C. and putting them all together? Is that really outside the possible action of MUG?

Indeed, how about finding those crated computers, identifying which hospitals have been denied access to

systems and telling the local congressmen and senators? Is this really not worth doing?

MUG has to realize that if the advantages of Mumps in the development cycle are to be appreciated and recognized, then more is needed than an ANSI OK. They have had that for five years now.

However, few people, even in the technical community, realize the differences and possibilities of Mumps-like development. As long as these are not appreciated, it is no wonder the traditional, centralized systems win out — systems that are painfully and inadequately specified in advance by nonmedical professionals and then wrapped into petrified, inflexible and patient-discouraging

packages.

MUG simply has not appreciated the duties that are imposed on anyone who carries technology further out to users, and it is this MUG failure to carry on the necessary effective education of us all that is, at root, responsible for the VA's being able successfully to deny the existence of the Mumps systems.

The 1981 VA situation should be regarded by MUG as being an almost unparalleled opportunity to get its own capabilities and those of Mumps across. Action now, without waiting for 1982, is the best way to proceed.

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LETTERS

(Continued from Page 32)

1981, Ralph Stout states:

"Complete data independence is the single most important performance requirement for future information systems... [and] has proven to be very elusive to achieve. though many systems claim to provide data independence, they achieve, at best, only varying degrees of separation... only one provides independent control over a mix of logical and physical structures."

The storage management system referred to is Set Theoretic Data Spaces [STDS] developed by Set Theoretic Information Systems. It not only has the data independence attributes above, but has dramatically demonstrated the performance improvements that can be achieved when the data management function is separated from the storage management function.

A task I ran using STDS required processing an unordered collection of records (3.6 million, occupying more than 61.6M bytes of disk storage) and cross-tabulating the values in several fields. This task required only 80 CPU seconds on an Amdahl Corp. V6 and produced more than 7,000 records. Further order of magnitude improvements are possible as these set operations are put in hardware in highly intelligent back-end machines. Whether the storage management function is accomplished in software in the host computer, in software at a remote site or in hardware, it is important the functionality of the data management and storage management be separated.

The data independence and performance of a DBMS will indeed be the issues of the '80s, and improvements in both will be best accomplished by decoupling data and storage management function.

Clifford R. Kuhl
Systems Analyst

Vector Research, Inc.
Ann Arbor, Mich.

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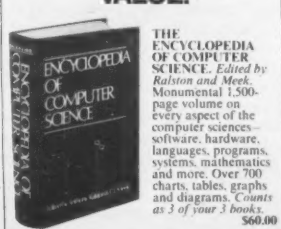
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Coin No Proof

"Shroud of Turin Dated to Time of Crucifixion" [CW, July 13] appears to contain an error of logic. The representation of a coin in a picture does not prove the picture was made during the same years the coin was being minted.

Assuming the portion of the coin shown is unlike any other coin, the most that could be proven is that the picture was not made before the coin was first minted.

A story so long on wishful thinking hardly merits so much press, nor *Computerworld's* front page.

William J. Harrington
Trenton, N.J.

Insight Missing

The front-page headline "Shroud of Turin Dated to Time of Crucifixion" [CW, July 13] grossly distorts the information presented in the article. The Page 4 headline demonstrates not only more editorial restraint, but also the essential insight missing in the story: The dating of the coin's image establishes only the earliest date the shroud's image could have been formed.

The later statement, "Textile experts examining ...

LETTERS

linen ... [by] tracing cotton ... further detracts from the article. Linen, of course, is made of flax, not cotton.

A complaint about *Computerworld's* wide breadth and shallow depth of news coverage must be raised: Stick to your areas of expertise or hire staff who can reason beyond the flak of press releases.

David D. Stubbs
Portland, Ore.

Myth or History?

While "Shroud of Turin Dated to Time of Crucifixion" [CW, July 13] will, I hope, raise interest in the historical credibility of Christianity among *Computerworld* readers, many may still respond that the New Testament is an historically inaccurate book full of myths, of which the bodily resurrection of Jesus Christ may be regarded as one of the chief.

Interestingly, the New Testament documents are some of the most historically reliable documents in the world. *The New Testament Documents: Are They Reliable?* by F.F. Bruce, presents the results of modern research and sound historical scholarship in readable form.

As for the "myth" of the bodily resurrection, here again the historical evidence is overwhelming. It is a shame my favorite book devoted to the defense of the resurrection, *Man Alive*, by Michael Green is out of print. But Frank Morison's excellent book, *Who Moved the Stone?* is still available.

All three books were published by Intervarsity Press.

Ronald C. Wackwitz
Programming Director
Comp-Aid Co.
New Braunfels, Texas

Misplaced Values

As cited in "Exec Says Programmer Productivity Just a Fad" [CW, June 22], Peter Lamasney is absolutely correct. Our industry does have a misplaced set of values.

Instead of being technology- or programming-oriented, we should put our emphasis on business and systems. How many times are we going to design systems to meet our hardware or software requirements? When are we going to get smart and start designing systems logically to meet our organizations' business requirements? No amount of elegant programming is going to solve anything if the problem is poorly specified in the first place.

We must stop the mad dash to the coding pads. Instead of

the user's requirements, not the computer's.

Programming should take less than 15% of the total elapsed development time. If done properly, programming should be a simple translation process. This gives credence to the increased popularity of program generators today. Let's also not forget that structured programming techniques are based on the assumption that the system design is complete to begin with.

Tim Bryce

M. Bryce & Associates, Inc.
Cincinnati, Ohio

Computerworld welcomes comments from its readers. Preference will be given to typed, double-spaced letters of 150 words or less. Letters should be addressed to Editor, *Computerworld*, P.O. Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

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UCC System Helps Manage Data Centers

DALLAS — A software system designed to help with data center management has been introduced by University Computing Co. (UCC) here.

Operating under MVS or VS/1 environments that support CICS/VS, UCC Eight/Crisp provides the ability to monitor problems, activities, projects and inventories within the data center. "It is ironic that DP came into being to automate certain functions within the corporate organization only to conduct its daily work [in] a manual or ... semi-automated [mode]," Product Manager Julia Donohue said.

"The time has come for the data center to gain control of its destiny by automating and managing the activities which will determine its level of success," she stated.

Suggested uses for the product include areas such as problem management, customer support or service and project control. For example, UCC Eight/Crisp can be used to track daily internal computer center problems and their assignment and resolution, the firm said. It also addresses management of the on-line network control center so line and terminal problems can be resolved with configuration data, equipment location and inventory information.

Product Features

Product features include an electronic mailbox, a broadcast facility, a priority system that utilizes up to 12 weeks of historical data, an alert function that notifies operators when a problem has not been corrected for a user-specified amount of time and a phone directory.

Available immediately, UCC Eight/Crisp costs \$45,000 and includes one year of maintenance. After the first year, the maintenance fee is \$5,400. The product is also offered for \$1,895/mo on a 36-month lease/purchase plan, which includes maintenance.

UCC is located at the UCC Tower, Exchange Park, Dallas, Texas 75235.

Subbing Dat-Fast for NCR Utility Brings Hospital More CPU Time

By Rita Shoor
CW Staff

DALLAS — Replacing NCR Corp.'s QDISCMGT utility with Dat-Fast from the Software Clearing House (SCH) has given 18 more hours of computer time every week to Presbyterian Hospital of Dallas.

The hospital had been using NCR's product for backup/restore procedures on all of its production runs, according to Tom Smith, one of seven programmers at the installation.

But plans to run additional applications on the shop's dual NCR 8550 Criterion processors were in the offing. And the time to run these new systems had to be carved out of the time spent running current applications, explained Carroll Innmon, assistant director of finance, who oversees Presbyterian's DP department.

In the effort to speed up backup runtimes, Smith, then a se-

nior computer operator, "heard some very encouraging things" about the NCR-compatible Dat-Fast package.

Not content to accept what he had heard on faith, Smith set up a benchmark test comparing the times required to run QDISCMGT and Dat-Fast for six daily production runs.

There was a substantial variance in runtimes between the two products — from 18 minutes to 40 minutes — for the six jobs and Dat-Fast ran more quickly than QDISCMGT in every case included in the benchmark.

Total runtime for the jobs was three hours and 33 minutes with NCR's package and 55 minutes for the SCH software, Smith said. The result was a net saving of two hours and 38 minutes on a daily basis or about 18 hours of computer time freed up every week.

The benchmark was run in

December 1980 and results since then "have met our expectations," Innmon said. "It would have been a bad day at Black Rock if they hadn't."

Figures show that Dat-Fast, which cost the hospital \$2,500 last year, paid for itself in approximately one month, Smith said. "The faster the tape drive, the faster it runs," he continued. "Its only limit is hardware speed."

Since Dat-Fast requires at least 64K bytes, QDISCMGT is still being used on some short computer runs with limited available memory. But the SCH product is currently utilized in about 80% of all production runs, according to Smith.

He initially ran into some problems restoring files from tape to disk. These have since been corrected and "out of the [NCR-compatible] packages available, it's the best," the operator-cum-programmer said.

Gives Single-Point File Viewing 'Datadictionary' Extended to DL/1

PRINCETON, N.J. — Applied Data Research, Inc. (ADR) has introduced support for IBM's DL/1 data base management system (DBMS) in its dictionary system. The option reportedly extends ADR's Datadictionary facilities to include "a wide range of descriptive information about the basic structure" of the DL/1 hierarchical DBMS.

Datadictionary's "multidata base support allows DL/1 users to view, control and manage data at a single point for DL/1, Datacom/DB and traditional files. The product supports secondary indexing and unidirectional, bidirectional and virtually paired bidirectional relationships. This allows physical and logical data bases to be designed with relationships and data fields that are unique to DL/1, ADR said.

The option also supports complete descriptions for logical data bases, including segment sensitivity and field sensitivity

and the logical data structure description provides a view of the physical/logical data base as seen by an individual DL/1 user.

A permanent license for Datadictionary ranges from \$15,000

to \$23,600. Available late in the third quarter of 1981, the DL/1 option license costs \$6,000 under DOS/VS and \$7,500 in OS/VS sites. ADR is at Rt. 206 and Orchard Road CN-8, Princeton, N.J. 08540.

'OPT' Lets CICS User Write Application in One Sitting

ATLANTA — An application generator and user-oriented query package that reportedly allows users of IBM's CICS to develop entire applications in a single sitting has been announced by SMS, Inc. here.

Said to "sharply reduce" the time and expertise required to write on-line application programs, the On-line Productivity Tool (OPT) is presently running in more than 20 CICS installations, according to Frank Beck, SMS president.

The product offers a fill-in-the-blanks method to create the

application program on a display screen. It allows users to become "highly productive with less than one day's training," he claimed.

Range of Capabilities

In addition to the end-user query techniques, OPT offers a range of file management capabilities for experienced programmers. It incorporates a Cobol-like procedural language for developing on-line programs requiring complex logic, data manipulation, record con-

(Continued on Page 38)

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'Vsam-Tune' Replaces Reports Produced With IBM's 'Listcat'

MT. FREEDOM, N.J. — Macro4, Inc. has announced Vsam-Tune for Vsam users operating in DOS/VS or DOS/VSE environments.

Designed to replace reports produced with IBM's Idcams Listcat software, Vsam-Tune was set up with the "typical Vsam user in mind," a spokesman said. This user is defined as someone who generated Vsam files by means of IBM default parameters, an approach that leads to redundant disk space, excessive I/O processing and

poor use of available core for buffering, Macro4 said.

Vsam-Tune reportedly optimizes Vsam performance by ensuring that at open time, Vsam clusters have the optimum number of I/O buffers for the processing about to be performed. It also generates recommendations for further performance gains based upon redefining the clusters, the spokesman explained.

The product indicates underutilized or wasted disk space and provides values to

be used in redefining Vsam clusters to release that wasted space, he continued.

Offered for \$250/mo on a one-year lease, Vsam-Tune is available from Macro4 at 1 W. Hanover Ave., Mount Freedom, N.J. 07970

'Igor 1' Gives Graphics In Real-Time

WOODLAND HILLS, Calif.

— Interactive Graphic Systems, Inc. (IGS) has introduced a package designed to provide real-time support for computer graphics applications requiring very high image update rates and operator interactivity levels.

A key feature of the package, which shares elements of the existing IGS GAM/GDL support package, is said to be the use of Sanders Associates, Inc.'s Graphic 7 vector refresh and Graphic 8 raster display systems as the supported display devices. The package also reportedly offers multitasking capability, debugging support and I/O features.

The initial release of Igor 1 is available for use with the Digital Equipment Corp. PDP-11 IAS or RSX-11M operating systems and the VAX-11/780 VMS operating system. Igor 1 as a stand-alone, with a license fee of \$3,500, will be available "shortly," a company spokeswoman said. The license fees for Igor 1 with GAM/GDL support start at \$8,400, with deliveries beginning in October.

IGS is located at Suite 225, French Quarter Plaza, 20969 Ventura Blvd., P.O. Box 1805, Woodland Hills, Calif. 91365.

'OPT' Backs CICS Users

(Continued from Page 37)
trol and arithmetic functions.

Because OPT is totally interactive, users are not required to work with batch compilers, program tables, transaction IDs or screen maps, the vendor said.

OPT runs as a CICS application program under DOS/VS, DOS/VSE, OS/VS1 and MVS and supports a variety of file access methods including Vsam and Isam and interfaces with DL/I, according to the vendor.

Available on a 30-day trial basis, monthly license fees for OPT begin at \$375. SMS is at 6075 Roswell Road, Atlanta, Ga. 30328.

Software Manages POS Communications

OMAHA, Neb. — Computime, Inc. is offering software designed to provide simultaneous communications over switched telephone lines from point-of-sale (POS) terminals.

Designated Point of Sale Communications Management System, the software is suited for medium and large retailers. It can be installed on any IBM mainframe running DOS/VS or DOS/VSE in a normal communications environment. A version for OS is being planned, as is an SDLC communications module, Computime said.

In operation, the system is driven by a "master call file" containing pertinent line and location data and selects the appropriate communications module based on the particular device type in each location, according to a Computime spokesman. This technique is said to eliminate device/data dependency in turnkey systems and vendor-supplied software.

The base system costs \$25,000; transmission modules are \$7,500 each; and communications statistics history and reporting modules are \$2,500 each, Computime said. The firm is located at Lakeside Atrium Building, 10407 Devonshire Circle, Omaha, Neb. 68114.

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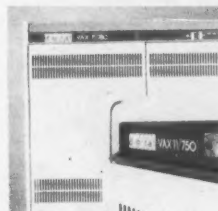
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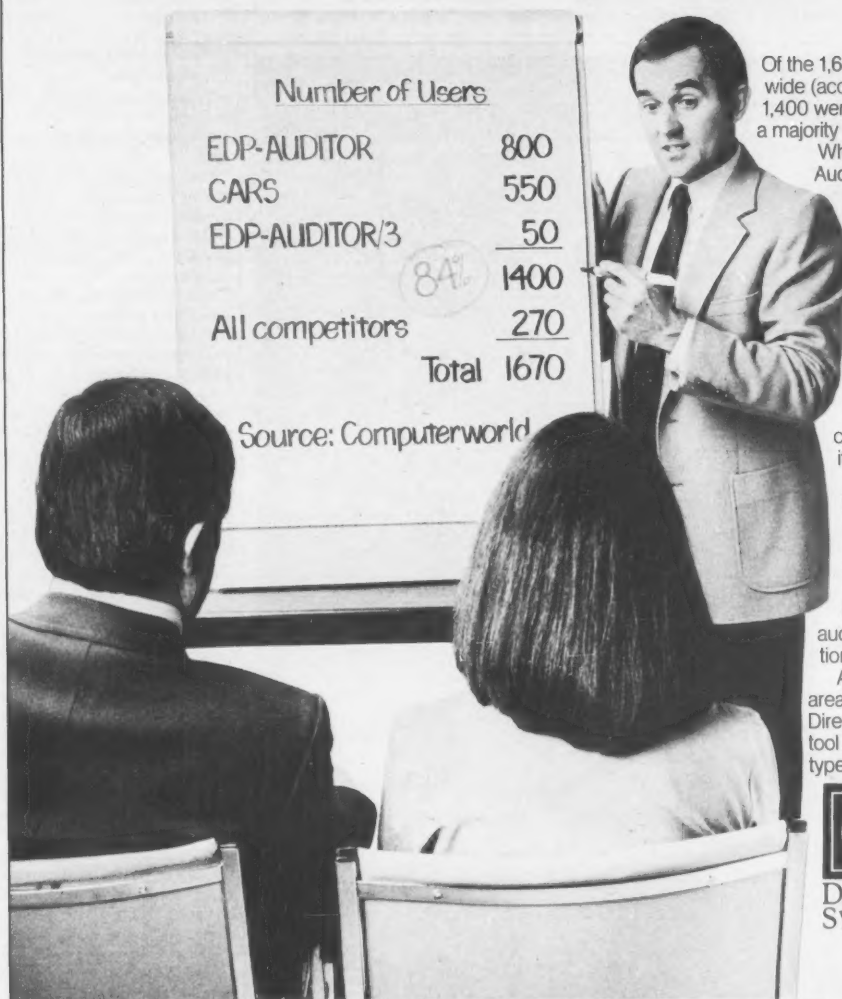
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CW8/3

'Tcup' Aids Burroughs Users

MINNEAPOLIS — A communications utility software package that allows users of Burroughs Corp. computers to create and maintain on-line and batch-processing systems is available from Technalysis Corp.

Technalysis Communications Utility Package (Tcup) consists of three interacting components.

The Message Control System controls communication between terminals and on-

line application programs. The Job Execution System executes and monitors a series of batch programs without operator intervention.

The Screen Formatter Package allows the user to design and generate code for CRT terminal screens in on-line applications, according to the vendor.

The entire package costs \$10,000, Technalysis said from 6700 France Ave. S., Minneapolis, Minn. 55435.

Utilizes 'Query-990'

Data Dictionary for DS990 Bows

DALLAS — A data dictionary software package said to provide the capability to generate reports describing data organization has been announced by Texas Instruments, Inc. for its DS990 systems.

The DD-990 permits the use of the company's Query-990 software to locate information stored in conventional files, the vendor said.

The dictionary allows the

user to analyze the impact of proposed data changes before the changes have to be made, and reports can be generated that identify what systems, programs, files and records are affected by the change, the company claimed.

The DD-990 is priced at \$2,500 to \$3,500 depending on the customer-selected media from Texas Instruments, Inc., Digital Systems Group,

P.O. Box 202146, Dallas, Texas 75220.

Pace Offers

IBM Users

'Komand/Basic'

MANASSAS, Va. — Pace Applied Technology, Inc., developer and supplier of the Komand family of job accounting program products, has introduced a job accounting system for IBM users called Komand/Basic.

Komand/Basic provides utilization and costing information with more than 30 preformatted reports available.

Also included is a report writer and statistical inquiry system that can produce a wide variety of special reports from the Komand/Basic data base.

Intended for the medium-sized IBM MVS or VS/1 user, the program will handle SMF and provide charge-back. Komand/Basic costs approximately \$10,000 from the firm at 7900 Sudley Road, Manassas, Va. 22110.

Publishers Get

Mini Package

MAYWOOD, N.J. — STC Systems, Inc., a wholly owned subsidiary of Storage Technology Corp., is offering the Subfil-Data System, a minicomputer business package designed for the magazine and journal subscription fulfillment industry.

The system operates with STC's Champ operating system and is fully compatible with the Pubs-Data system for the book publishing industry.

Both systems can operate on any of STC's hardware — from 12M bytes to 1,200M bytes of storage, the vendor said.

The package costs \$25,000 from the firm at 9 Brook Ave., Maywood, N.J. 07607.

DPL Users

Form Group

CUPERTINO, Calif. — Users of DPL, National Information Systems, Inc.'s data base management system for Digital Equipment Corp. processors, recently formed a group here.

Walter Scrivens of Johnson & Johnson in Raritan, N.J., was elected president of the new organization that is intended to provide a central forum for the exchange of information and the direction of DPL.

National Information Systems is at Suite 245, 20370 Town Center Lane, Cupertino, Calif. 95014.

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Univac Program Backs Municipal Finances

BLUE BELL, Pa. — Sperry Univac has unveiled an interactive software program for handling local government financial applications.

Total Accounting for Government (TAG) runs on the vendor's System 80 and was designed by the Certified Public Accounting firm of Main Hurdman & Cranstoun.

The program can be used for budgetary appropriations and encumbrance account-

ing, general ledger accounting, subsidiary ledger accounting, vendor data (purchasing history file), cash controls (receipts and disbursements), departmental accounting and expenditure and revenue projections.

The software package costs \$25,000 from the firm at 3 Center Plaza, Philadelphia, Pa. 19102.

Small Systems Gain Package For Projects

SOLANA BEACH, Calif. — A project planning and control package that runs on small business systems has been unveiled by F.H. Krantz Associates.

Project Master II is for project managers "with problems," according to a spokesman. In the project planning mode, task data and task precedence relationships are used to develop and display all higher level schedules.

Schedules are automatically adjusted for temporary shortages of key skills and level-of-effort tasks that must continue until project completion.

In project control mode, the software uses monthly inputs on accomplishments and expenditures to compute current schedule and financial status at every level.

Project Master II costs \$7,500 from the firm at 215 S. Highway 101, Solana Beach, Calif. 92075.

Package Assists Cobol Programmers

NEW YORK — A software package designed to let Cobol programmers "use the English language to its fullest advantage" has been announced by Sitnerology Co.

The Cobol Clarity package reads Cobol source coding and, via printed messages, provides guidelines for modifications that should make the coding "more clearly understandable, fully source-documented and standardized," according to company president Jerry Sitner.

Implementation proceeds through four phases, he explained. First, there is a management orientation to help supervisors

"set the clarity tone for their staff." A session for programmer/analysts is set up to "condition and encourage them" to the Clarity approach, Sitner said.

A detailed orientation is provided for the staff member selected to ensure that the proper programming approach is sustained. Package installation takes place in the final phase.

Available immediately, the three orientation sessions cost \$1,500 and the processor itself can be leased for \$350/mo. Sitnerology is headquartered at 14 Washington Place, New York, N.Y. 10003.



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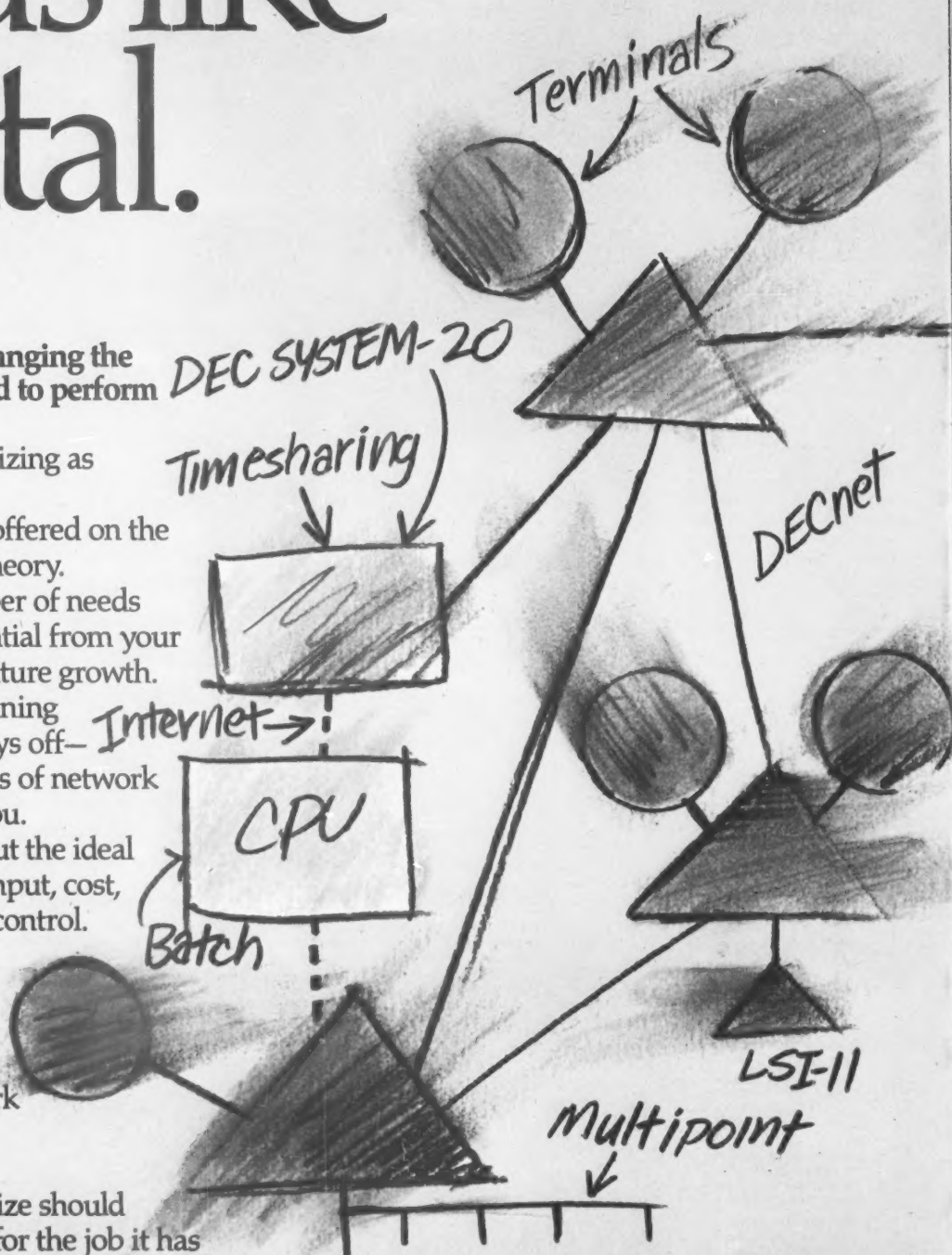
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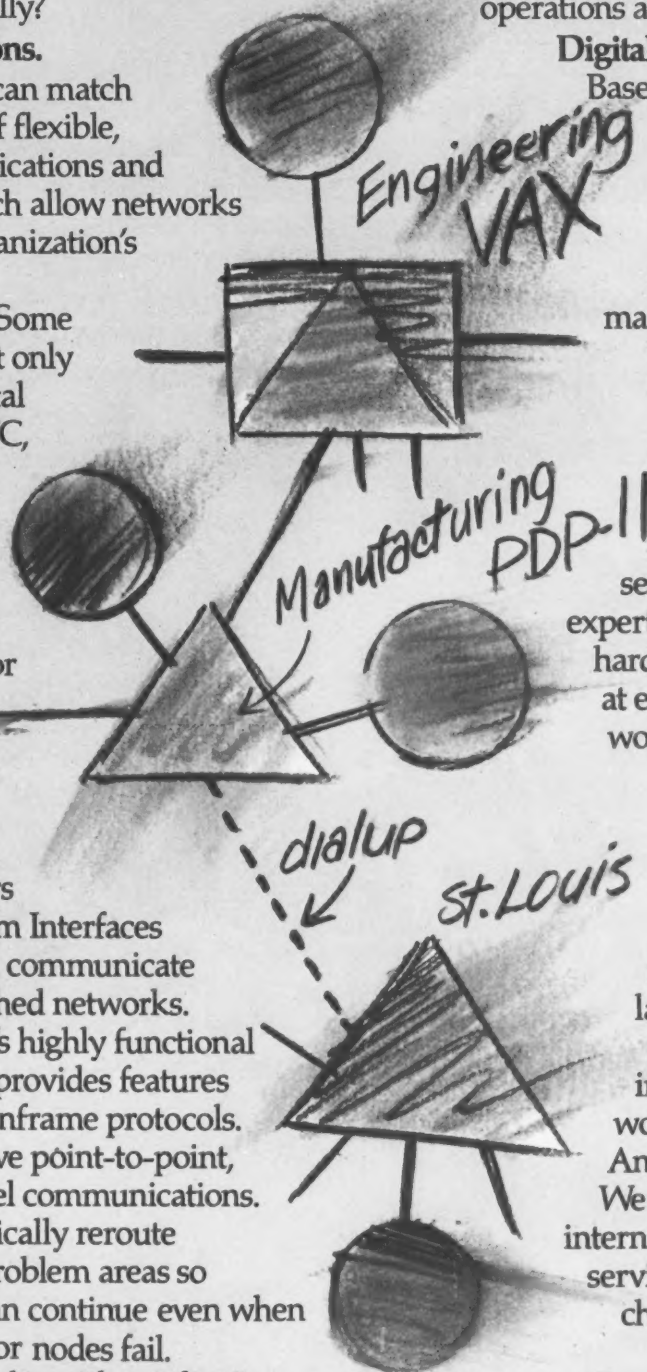
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'Cadets' Now On Wang Minis

NEW YORK — Commercial Software, Inc. has announced its Cadets telephone and telecommunications cost accounting software now runs on Wang Laboratories, Inc. VS minicomputers.

Previously available for use with only IBM mainframes, the Cadets software had an interactive data base updating capability added to it, resulting in the Wang compatibility. Because the VS supports word processing, it can be used to assist in directory preparation.

Cadets costs between \$45,000 and \$50,000, depending on computer configuration, CSI said from 420 Lexington Ave., New York, N.Y. 10017.

Cobol Generator Fits Variety of Machines

PITTSBURGH, Pa. — A Cobol generator available on Data General Corp. AOS, as well as Hewlett-Packard Co., Prime Computer Corp., Tandem Corp. and Texas Instruments, Inc. computers, has been announced by Phoenix Systems, Inc.

Pegasus operates off a data dictionary and provides more than 10,000 lines of code per day in production of complete programs in Ansi '74 Cobol, the vendor said.

Pegasus is priced at \$2,450 from Phoenix Systems, Inc., 1106 Ohio River Blvd., Sewickley, Pa. 15143.

'Purchase-Master' Package Offers Management Control

DUNSMUIR, Calif. — A requisition and purchasing management control system developed for use on Data General Corp. computers has been announced by Applied Business Systems, Inc.

Purchase-Master is organized into three major functional areas: stock requisition control, purchase order preparation and analysis and purchase order tracking. The package was designed for use on a stand-

alone basis or in conjunction with the firm's production control, inventory management and/or accounts payable systems.

The package consists of approximately 50 program modules written in Extended Basic for operation on DG computers under RDOS or AOS. The license fee for end users is \$2,500. The firm is located at 4350 Upper Soda Road, Dunsmuir, Calif. 96025.

'Pacs' Release 3.0 Billing System Has Budget-Checking Procedure

SANTA BARBARA, Calif. — A new release of Signal Technology, Inc.'s charge-back billing system for Digital Equipment Corp. VAX-11 processors is said to feature simplified data maintenance, data display and budget-checking procedures.

Release 3.0 of the Process Accounting and Chargeback System (Pacs) includes Pacsgraph, which the vendor said displays resource utilization by hour of the day. Twelve different resources may be selected for display on a standard DEC VT100 terminal, the vendor said.

A budget-checking option reportedly warns the user of approaching budget overruns, and can lock out users who have exceeded their budgets. Pacs is written in VAX Fortran

77 and macroassembler and operates under the VMS operating system. A one-time license fee of \$3,900 includes documentation, source programs, installation and a year of free maintenance and updates.

Signal is located at 15 W. De La Guerra St., Santa Barbara, Calif. 93101.

Cemetery System Fits Series/1

SPRING HOUSE, Pa. — Whelan Associates, Inc. has developed a Cemetery Accounting System for use with the IBM Series/1 minicomputer.

The system features installment accounts receivable, endowed care billing and inquiry, disbursements, planting orders, lot cards, interment

DBMS Offered Free With 'Impact'

EAST BRUNSWICK, N.J. — MDCR, Inc. is offering its data base management system (DBMS), IRS, free to buyers of Impact, a financial modeling language.

IRS is fully integrated with Impact, so users reportedly can use the full range of IRS commands. Together, the products provide a complete range of conversational data handling as well as reporting, planning, analysis and financial modeling, according to MDCR.

Both run on IBM 370 and compatible computers. Interactive versions are available for use with the VM/370 and MVS operating systems, the vendor said.

Impact costs \$52,000 for a perpetual license, or can be rented for \$1,500/mo.

The free DBMS offer applies until Dec. 31. More information is available from MDCR at Suite 120, 760 Highway 18, E. Brunswick, N.J. 08816.

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Unit Analyzes Response Time On IBM 3270, NCR 501 Nets

EAST NORWALK, Conn. — A response time analyzer that determines the performance level of data communications networks utilizing IBM 3270 (or 3270 look-alikes) and NCR Corp. 501 terminals is available from Datacomm Management Sciences, Inc.

The RTA-327 reportedly allows all measurements to be made at the CPU or remote controller site via a bridged (in-service, noninterfering)

basis on the RS-232 interface between the communications controller and modem equipment.

It is designed for use with binary synchronous communications or Standard Data Link Control protocols with IBM 3270 or equivalent terminals operating in the conversational mode.

The response time analyzer costs \$4,875 from Datacomm at 25 Van Zant St., East Norwalk, Conn. 06855.

Backus' Digilink Functions As Switch or Print Buffer

SAN JOSE, Calif. — Backus Data Systems, Inc. is offering a device that can be utilized as an intelligent switch or print buffer device.

The Digilink can be configured to connect two dissimilar terminals to share one modem or connect two remote CPUs back-to-back with a monitor terminal on a third port, the vendor said.

Reportedly, each individual RS-232 port can be dependently set up through keyboard commands to accommodate devices with different bit/sec rates, parity, X-on/X-off, fill characters, buffer length and automatic line feed.

Pricing for the 4K-byte model starts at \$775, Backus said from Suite 110, 1440 Koll Circle, San Jose, Calif. 95112.

Converter Lets Ascii Units Emulate IBM 3277-2 Units

TORRANCE, Calif. — A protocol converter that enables low-cost Ascii asynchronous terminals to emulate IBM's 3277-2 display station for interactive communications with a binary synchronous communications (BSC) host is available from Local Data, Inc.

The Datalynx/3270 appears to the host as an IBM 3271-2 cluster controller. It converts the Ebcidic code and BSC data format of the host into Ascii code and asynchronous format, the vendor said.

Two asynchronous RS-232C input/output channels are said

to enable one Datalynx to link two terminals or one terminal and one RS-232C printer interactively with the BSC host.

The protocol converter costs \$1,950 from Local Data at 2701 Toledo St., Torrance, Calif. 90503.



Local Data's Datalynx/3270

Univac Adds Software, Buffered Teletypewriter To UTS Terminal Series

BLUE BELL, Pa. — Sperry Univac has enhanced its UTS family of terminals by adding a text processing utility, an edit processor program and a buffered model of the UTS 10 with Teletype Corp. Model 33-compatible keyboard send/receive (KSR) protocol.

The text processing utility is available for the UTS 40, allowing it to utilize the Univac 0791 correspondence-quality printer. It provides a text processing capability for UTS 40 users who wish to extend the usefulness of the terminal as a multipurpose device.

In addition, the utility is said to furnish the capability to create, modify, store or retrieve and transmit to a Univac host computer and print text information. The program operates on a UTS 40 intelligent terminal with 65K bytes of user random-access memory (RAM), at least one diskette and usually a letter-quality printer.

The text processing utility licenses for \$25/mo.

The edit processor program is designed for use with the UTS 40 programmable CRT terminal and reportedly provides the capability to process programmer source files, including line insertions and deletions.

Both the edit processor and text editing utility can operate in a stand-alone mode using standard UTS 40 hardware configurations. The UTS 40 can also communicate with a Univac host system using the OS/3, VS/9 and 100 OS operating systems or execute any other user-developed program at other times, said the vendor.

The edit processor program has a monthly license fee of \$30.

The buffered KSR 33 protocol UTS 10 is supported by software resident in Univac host systems using the OS/3, VS/9 and 1100 OS operating systems. The purchase price for this model is \$1,560, Univac said. More information is available from P.O. Box 500, Blue Bell, Pa. 19424.

X.25 Exerciser/Tester Gets Speed, Disk Support Options

SPRINGFIELD, Va. — Dynatech Packet Technology, Inc. has announced two options for the NET/18, its X.25 network exerciser/tester. NET/18 is a self-contained system that simulates all levels of the X.25/X.75 protocol and can simulate data terminal equipment or data communications equipment, the vendor said.

The first option, NET/18-HS high-speed option, involves hardware and software to increase the power and line speed of NET/18 so it can debug and monitor at line speeds up to

56K bit/sec, the vendor said.

The second option, NET/18 multiple disk drive support, provides support for multiple disk drives utilizing a dual-drive unit. The attachment of this unit will reportedly add two more drives and more than 180K bytes of on-line storage to the one drive of approximately 20K bytes now available.

The high speed option costs \$2,000, the multiple disk drive support is priced at \$1,400, and the NET/18 costs \$18,000. Dynatech is at 7664-A Fullerton Road, Springfield, Va. 22153.

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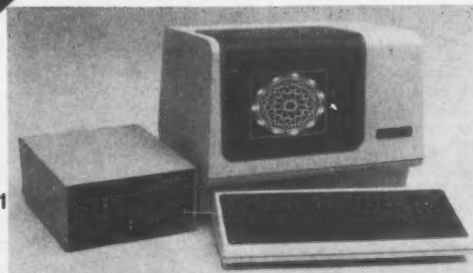
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CRT Terminal Boasts Easy Movement

TUSTIN, Calif. — General Terminal Corp. has unveiled a CRT terminal composed of three modules that allows users to raise, lower, tilt or rotate the terminal.

The Avant 300 features host-programmable function keys, smooth scroll and line and block graphics capability.

It also has a standard detached keyboard with such features as key click and editing keys.

The CRT terminal costs \$1,249 from GTC at 14831

Franklin Ave., Tustin, Calif. 92680.

Modem Registered For Direct Connect

SUNNYVALE, Calif. — Racal-Vadic has unveiled a 2,400 bit/sec direct-connect modem designed for remote terminal users.

The VA2450/55 is FCC-registered for direct connect to the switched telephone network through voice or programmable data jacks. A 2- or 4-wire leased line version is also available for point-to-point and multipoint systems.

A "voice/data" switch on the front of the modem eliminates the need for special telephones. The user must plug in a standard "T" adapter that comes with the unit.

The price for the modem is \$725, Racal-Vadic said from 222 Caspian Drive, Sunnyvale, Calif. 94086.

Kinex Modem Runs On Leased Lines

LARGO, Fla. — Kinex Corp. has unveiled a 4,800 bit/sec modem equipped with a two by 2,400 bit/sec multiplexer intended for operation on point-to-point leased lines.

The Model 4800/M channel-splitting modem features a multiplexer with an elastic buffer on each channel, which provides for the use of tail circuit modems on both. Each channel has a simulated switched-carrier capability, allowing tail circuits to be multipoint networks operated in the polling mode.

The modem is equipped with test features that allow nontechnical personnel to determine line conditions and perform fault isolation.

The product costs \$3,100 from Kinex at 6793 Cross Bayou Drive, Largo, Fla. 33543.

Serial Line Adapter Out for DEC PDP-11

ORANGE, Calif. — MDB Systems, Inc. has announced the MDL-11 asynchronous serial line adapter for Digital Equipment Corp. PDP-11 processors.

The unit combines the functions of five DEC modules and offers an RS-422 protocol and a buffer ready circuit on one circuit board.

Called the MDL-11, the serial line interface permits direct full- or half-duplex communications between PDP-11 processors and terminals or modems via RS-232C, 20mA current loop or RS-422 circuitry.

The unit costs \$825, the vendor said from 1995 N. Batavia St., Orange, Calif. 92665.

Giltronix Premieres Switching Units Line

PALO ALTO, Calif. — Giltronix, Inc. has announced a line of switching and monitoring units and a port switching device.

The GTNS line of switching and monitoring units are rack-mountable modules, with each module capable of switching up to 24 EIA signals and monitoring up to six handshake signals.

An eight-signal module (GT158) costs \$116 and a 24-signal module (GT1524) costs \$126, the vendor said.

Also announced was the ABC switching unit that allows two processors to share a common device such as a printer or terminal. The switching units range from \$99 to \$106, the vendor said from Suite 44, 450 San Antonio Road, Palo Alto, Calif. 94306.

IBM Recorder Data Replaces Model 8040

AUSTIN, Texas — Auscom, Inc. has announced an IBM channel data recorder, the Model 8041, that replaces the firm's earlier Model 8040.

The unit provides continuous monitoring and recording of both the tag and bus signals on IBM channels. The unit can monitor daily system operation, IBM channel interface product development and perform troubleshooting functions, the vendor said.

The unit was designed specifically for operation on IBM's 360 and 370 series processors along with the more recent 30 series and 4300 processors. Data capacity of 8041 is 1,024 events. The capacity is expandable to 4,096 events, the vendor said.

The unit costs \$4,495 from Suite 102, 2007 Kramer Lane, Austin, Texas 78758.



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Modem Targets Teletype Users

PHOENIX — A built-in modem for use with the Teletype Corp. Model 43 terminal is available from Omnitec Data Corp.

The Model 9143AD was designed to originate/auto-answer up to 300 bit/sec over the switched telephone network. It provides half- or full-duplex transmission or reception (controlled by terminal) of serial or binary data, the vendor said.

The unit is field programmable for any standard protocol in the Bell 103 series.

Voice or data calls are originated with any standard modular telephone Touch-Tone or rotary, and an exclusion key is not necessary, the vendor said. The unit will also automatically switch from voice to data mode and features automatic disconnect in both the originate and auto-answer modes.

The modem costs \$195 from Omnitec at 2405 S. 20th St., Phoenix, Ariz. 85034.

Interface Out For LSI-11 Bus

AUSTIN, Texas — National Instruments, Inc. has announced the GPIB11V-2, an interface between the IEEE-488 bus and the Digital Equipment Corp. LSI-11 Q-Bus.

The unit provides data transfer speeds of up to 250K byte/sec while allowing 16-, 18- or 22-bit addressing on the LSI-11 bus, according to the vendor.

Features include an extended talker, an extended listener and a controller. The interface was designed to work with either a single or multiple controller environment with a programmable system controller, the vendor said.

Support software includes drivers, utilities and an interactive control program. The standard software package supports Basic, Fortran and Macro callable subroutines under the RT-11 and RSX operating systems, the vendor said.

The interface uses large-scale integrated circuitry plus gate array and programmable array logic, the firm said.

The standard interface including the interface card, software, a four-meter cable with connector and documentation costs \$1,495, the vendor said from 8900 Shoal Creek Blvd., Austin, Texas, 78758.

Modem Features Bell Compatibility

ST. PAUL, Minn. — Astrocom Corp. has unveiled a 300- to 1,200 bit/sec originate-answer modem that offers end-to-end compatibility with Bell 212-type units.

The Model 212A can be installed by the user in minutes and features an integrated originate control key, eliminating the need for a special phone with an exclusion key, the vendor said.

The modem is based on two Bell-designed MOS large-scale integration chips and costs \$795, Astrocom said from 120 W. Plato Blvd., St. Paul, Minn. 55107.

Scanner Runs With 3270 Line

MINNEAPOLIS — National Computer Systems, Inc. (NCS) announced that its Sentry 7001 optical mark reader is available with an IBM 3270 communications option that allows the scanner to be interfaced to the IBM 3271, 3272, 3274 with Type B adapter and the IBM System/3 local display adapter.

The scanner is user-programmable and features data editing and formatting capabilities. Program storage consists of 44K bytes of bubble memory.

The 7001 costs \$21,000 without the 3270 option and an additional \$4,000 with it.

NCS is located at 4401 W. 76th St., Minneapolis, Minn. 55435.

Espirit Out For Editing

GREENLAWN, N.Y. — A buffered CRT terminal said to offer editing capabilities through a block mode of operation has been announced by Hazeltine Corp.

The Espirit features complete 128-char. Ascii set on a 12-in. nonglare screen with green characters formed by a seven-by-nine dot matrix to reduce eye fatigue.

Editing features include insert and delete, erase field, erase to end of line and erase foreground functions, the vendor said.

Espirit is priced at \$695 with quantity discounts available from Hazeltine Corp., Greenlawn, N.Y. 11740.

Terminal Runs With VT100

SUNNYVALE, Calif. — An interactive programmable CRT terminal compatible with Digital Equipment Corp.'s VT100 is available from Direct, Inc.

The VP800/C comes with 16K bytes of display random-access memory that can be upgraded to 32K bytes. Also included are a buffered printer port, buffered editing, forms mode, field attribute and the ability to down load programs or sections of programs.

The terminal's editing features include erase line, erase page, insert character, delete character, insert line and delete line. It costs \$1,850 from Direct at 1279 Lawrence Station Road, Sunnyvale, Calif. 94086.

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October 5 (Day 1)

8:45-9:15 **Keynote**

A-1

9:15-9:45 **Coffee Break**

9:45-10:45 **Mini & Micro-Based OEM Business Update**

A-2

- a. Reagonomics.
- b. Boon or bust.
- c. Emerging trends.
- d. How strong is the market 6-18 months out?
- e. What are the new growth areas?
- f. Market shifts in the next five years—what to expect.

9:45-10:45 **Industrial Dimensions Panel**

A-3

- a. Business structure: an overview of how most OEM's are structured today.
- b. Varieties of OEMs for every market.
- c. Vertical and horizontal opportunities—product and internal philosophy.

11:00-12:00 **OEM Survival Tools for the 1980's**

A-4

The survival of an OEM depends upon the firm's ability to make a consecutive series of complex market decisions concerning what market segments to pursue, what product features to include and what sales strategies to employ. Many companies run into difficulties because these crucial decisions are opinion based rather than data based. This session introduces a number of simple, practical tools that every OEM can employ to more astutely analyze the marketplace and respond to its ever-changing demands.

11:00-12:00 **Acquisition and Diversification**

A-5

- Mergers and acquisitions: the viable alternative to corporate growth.
- a. The pros and cons of merger vs. going public.
 - b. Why a company should consider merger and/or acquisition as a sound way to grow.
 - c. How to properly plan an orderly merger/acquisition program.
 - d. Why mergers/acquisitions help make a company more competitive in the marketplace.

12:00-1:30 **Luncheon**

1:30-2:30 **Influence of Growing Local Networks (Part I)**

N-1

- a. What's hot and why.
- b. Where are we headed & what's the time frame?

2:45-3:45 **Influence of Growing Local Networks (Part II)**

N-2

2:45-3:45 **Intelligent VDTs and Desktop Systems**

N-3

- a. Impact as net elements.
- b. Distributed data bases.
- c. Can we do without a mainframe?

1:30-2:30 **Input/Output: Market & Technological Structures**

T-1

- a. Printers.
- b. CRTs.

2:45-3:45 **Mass Magnetic Memory: Market & Technological Structures**

T-2

- a. Overview & future trends.
- b. Floppy, Winchester & other disk memory.
- c. Streamers vs. start-stop tape drives.
- d. 64K bit/chip and beyond.

4:00-5:00 **Voice I/O and Other Analogue I/O: Market & Technological Structures**

T-3

- a. When do benefits equal cost?
- b. Architecture examples.

1:30-2:30 **Retail Outlets**

O-1

- a. What's the outlook?
- b. Will the big boys dominate?

2:45-3:45 **Are You Ready for an Ad Agency?**

O-2

- a. Make or buy criterion?
- b. Agency selection.
- c. How you and your agency can best work together.
- d. Where can consumer-level tactics work?

4:00-5:00 **OEM Agreements**

O-3

- a. Franchise fees.
- b. Sales territories, distribution rights.
- c. Quotas, credit, payment.
- d. Second sourcing protection.

1:30-2:30 **Application Generating Tools**

S-1

- a. Benefits of "user friendly" systems.
- b. Increasing profits and productivity through the use of application generators.
- c. Developing and marketing a system with an application generator as the nucleus.

2:45-3:45 **Software Management Strategies**

S-2

- a. Value added software development.
- b. Documentation: Gaining a multiplier for software support.
- c. Transportability: Controlling competitive influences.
- d. 24 ways to improve turnkey software.

4:00-5:00 **Application Dynamics: Planning for Changes**

S-3

- a. Processor independent transportability.
- b. Compatibility for expansion.
- c. Holding down maintenance overhead.

1:30-2:30 **Microcomputer Trends**

P-1

- a. 8, 16, 32-bit processors.
- b. Trade-offs & time frame.
- c. The effects of plummeting costs on high-level processors & high-capacity memory chips.
- d. The near-term system of the future—32-bit micro & 256K bit RAM chips?

2:45-3:45 **Legal Aspects of the Third Party Market**

P-2

- a. Legal aspects of OEM vendor arrangements from both the manufacturer and OEM perspectives.

- b. Manufacturer, distributor, dealer, rep., final customer, who can get burned the most and what degree of protection is possible.

4:00-5:00 **Desktop Computer**

P-3

- a. Struggle for the right niche in a viper's nest of competition.

1:30-2:30 **IBM Watch**

C-1

2:30-2:45 **Coffee Break**

C-2

2:45-3:45 **HP Watch**

C-3

4:00-5:00 **TI Watch**

C-3

October 6 (Day 2)

8:30-9:45 **Japanese Vendors "Meet the Press"**

B-1

Four Japanese vendors will be interviewed by editors from leading computer newspapers, business publications and financial journals about the growth of Japanese firms in the U.S. domestic markets.

9:45-10:15 **Coffee Break**

10:15-11:15 **Software: The Growth Area of the Decade**

B-2

- a. Market strategies.
- b. Managing software projects: If you can't plan it, you can't do it.

10:15-11:15 **Financing Your Business and Product Development**

B-3

- a. How much money is needed to start and stay in business? Proformas?
- b. Forecasting/budgeting.
- c. Working capital/venture capital.

11:30-12:30 **Sales & Marketing Planning**

B-4

- a. Main goal & objectives.
- b. Common errors.
- c. Key account strategies.
- d. Distribution channel considerations.
- e. External & internal organizational structures.

11:30-12:30 **The Service Alternative**

B-5

- a. When does free consulting and service become a profit killer?
- b. The OEM and the service questions. Is there a service requirement? Advantages and disadvantages to the OEM. Methods available to accomplish/solve service requirements.

12:30-2:00 **Luncheon**

2:00-3:00 **Europe as a Market**

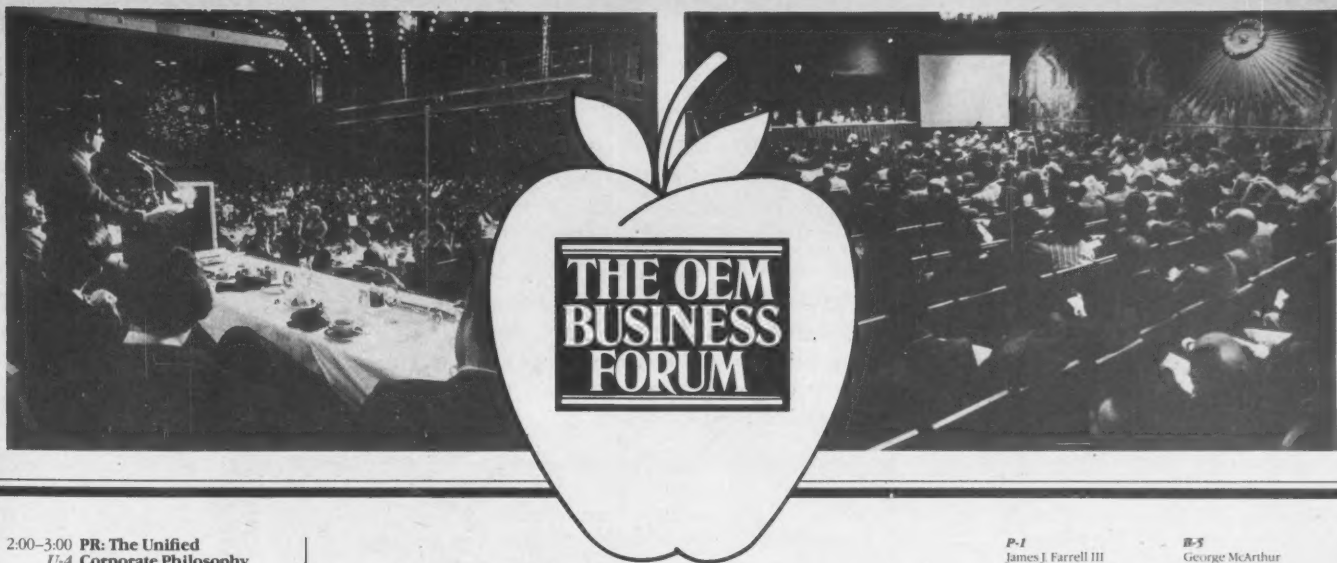
M-4

- a. Are you ready?
- b. Is Europe ready for you?
- c. Effective channels of distribution.
- d. Marketing philosophies among countries.

3:45-4:15 **Beyond the European Market: The Next Step?**

M-5

- a. Best bets.
- b. Update on the market.
- c. Channels of distribution.
- d. Maintenance and service.



Register now!

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Featured Speakers Include:

A-1
Al Lav
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Cado Systems Corporation

A-2
Lawrence Chimierne
President
Chase Econometrics
Division of Chase
Manhattan Bank

A-4
Jack Keene
Director Management
Products
Input

A-5
Bernard Goldstein
Partner
Broadview Associates
Robert J. Conrads
Principal
McKinsey & Company

Luncheon
Art Hols
Author/NFL Official
"The Challenge of a Pro"

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Vector Graphic, Inc.

N-2
Robert D. Brannon
Marketing Manager
OEM Microcomputer
Systems
Intel Corporation

N-3
Jon R. David
President
Systems R & D Incorporated
Regional Director
Tandem Computers

T-2
Andrew Roman
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Roman Associates
International

T-3
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National Sales Manager
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C-3
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OEM Marketing Manager
Texas Instruments, Inc.

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Canon USA, Inc.

B-2
Ann Winblad
Marketing Director,
Product Planning
Open Systems, Inc.

B-3
Robert H. Ranson
Director, Systems Marketing
Arrow Electronics, Inc.

B-5
George McArthur
Sales Manager
Decision Data

Luncheon
William Moore, Jr.
Vice President Computer
Operations
Perkin-Elmer Corporation

M-4
Christopher Codrington
Interco Business
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U-4
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S-4
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Cost is \$295 for two full days of sessions and lunch each day. There will be a \$50 service charge for cancellations after September 28. Registration may be transferred at no charge. Contact the New York Hilton directly for hotel accommodations; call 212-586-7000, and mention you'll be attending THE OEM BUSINESS FORUM.

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A. Product/Industry.
Please circle ONE only.

10 Systems Integrators/Systems Houses

20 Software/Service Vendors

30 Multi-Quantity End Users

40 Manufacturers of Computer Systems or Peripherals

50 Manufacturers of Office, Business, Personal and Consumer Systems

60 Hardware OEMs

70 Distributors/Dealers/Retailers

80 Consultants

90 Other (Specify) _____

B. Title/Function.
Please circle ONE only.

10 Corporate Management

20 Operations Management

30 Software Development

40 Engineering

50 Marketing

60 Consultants

70 Researchers/Educators

90 Other (Specify) _____

C. Size of Organization (no. of employees)

—A. Under 100 B. 100-499

—C. 500-999 D. 1,000-4,999

—E. Over 5,000

D. How did you hear about the OEM Business Forum?

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2:00-3:00 **PR: The Unified Corporate Philosophy**
U-4
a. Agency selection.
b. Developing the plan & positioning the product.
c. Press tours/conferences.
d. Releases.
e. Editor contact & the importance of personal involvement.

3:15-4:15 **Office Automation: One Step Beyond WP?**
U-5
a. Overview and future trends.
b. Strategies and techniques for OA equipment sales.

2:00-3:00 **Special ADAPSO Session**
P-4

2:00-3:00 **Sourcing Software**
S-4
a. An overview of the problem in today's market.
b. Make or buy? Realistic estimating of costs.
c. Evaluating packages for resale.
d. Evaluating a custom software house.

3:15-4:15 **Watering the Software Desert**
S-5
a. Potentials of dealing with software publishing houses.
b. Alternatives in distributing software. Computer manufacturer programs to classified ads.

2:00-3:00 **DG Watch**
C-4

3:15-4:15 **DEC Watch**
C-5

"SPECIAL EARLY BIRD SESSION"
October 6, 1981
7:45-8:30 AM
"INVESTING IN THE OEM INDUSTRY"

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Consider the burden facing data base management in such an environment.

Users must be able to distribute a data base not only across multiple processors, but also across multiple systems in a network.

If the data base model is dependent on hard coded pointers within the files, updating all these pointers is a nightmare. The problem is compounded if any one remote location is not available at the time of an update. Without concurrent access, the state of the data base is potentially inconsistent.

These pointer problems make both hierarchical and network data base models inflexible and difficult to modify. When the requirement to move files and applications among processors and among systems is coupled with the need to maintain the ability to transparently access the data base from any point in the network, the problems become staggering.

The solutions are in the relational database model.

A relational data base is a collection of data items represented logically as two dimensional tables. Files use logical fields within records as their only required linking mechanism. Users need not be concerned about details of structure, only about the logical relationships which exist between files. This simplicity and the ease of use inherent to relational data bases has been obscured historically by attempts of vendors to shoehorn or add on relational structure to a conventional operating system. The results are laboratory curiosities, interesting but

cumbersome, and they give relational models an undeserved reputation for poor performance.

The Tandem data base management system, ENCOMPASS, is the world's first on-line relational DBMS designed right into the operating system.

It is optimized for high performance and NonStop™ operation. Residing in each processor, ENCOMPASS provides complete independence from concerns about physical location of data. A user or an applications programmer need only know the file name of the data, peripheral device or system to be accessed.

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TANDEM

A whole generation ahead



To Fuel International System New Minis Update Chevron's Old CPUs

Special to CW

SAN FRANCISCO — Veteran mainframe users that want to update an old processor usually discover there is a thin line separating mainframes, as they knew them, from today's minicomputers.

Most users take advantage of this difference and replace outdated mainframes with new superminicomputers. However, a few revitalize tired and overworked CPUs by adding 16-bit minicomputer "crutches" to the system.

Rather than select any one road to take, Standard Oil Co. of California (Chevron) chose both routes. In one application, Chevron replaced a mainframe with a Data General Corp. MV/8000 32-bit minicomputer. And at another site, the firm aided an IBM 370/168-based system by front-ending the mainframe with a DG C/330 minicomputer.

CIS System

The firm's first application is the Chevron International System (CIS), an accounting and management information system that tracks a \$1 billion-per-year international marine and aviation fuel business. Before acquiring the MV/8000, the CIS depended on a 10-year-old IBM 360 mainframe to produce fuel and petrochemical invoices and process needed sales reports. The mainframe worked in conjunction with a DG M/600 processor that supported production and maintenance and a similar Eclipse C/350 in Croydon, England.

But the years and a growing transaction flow eventually took their toll on the IBM-centered system.

"The system was slowly dying," Robert G. Williamson, Chevron International's vice-president of finance, said. "Terminal hardware was failing; both terminal hardware and control program software were no longer supported." In short, "I would characterize our ability to effect changes to the application then as glacial or nonexistent," Williamson said.

Chevron's vice-president noted that the IBM's batch orientation forced the CIS Division to accept week-long dead periods on invoicing during month-end corporate balancing that severely hampered billing and cash flow. Because a new system would have to serve two locations — one here in San Francisco and the other in En-

gland — as well as provide distributed processing and on-line access, the firm decided to scrap the aging mainframe.

The firm added the 32-bit superminicomputer — DG's 100,000th computer shipped — to the San Francisco site last May. Now the American leg of CIS consists of the M/600 and the MV/8000.

The latter processor has two Dasher D200 terminals and three disk systems providing a total of 478M bytes of on-line storage. Software includes DG's Infos II file management system, Cobol and Hasp communications software.

"We brought the MV/8000 system to San Francisco to separate production and maintenance and thereby speed transaction processing and increase our disk space availability," said Howard E. Wise, manager of the firm's Marketing Applications Development Division.

With the upgrade, Chevron International continues to supply more than 400 in-

ternational shipping ports and 50 airports with fuels, lubricants and specialized fuel products.

The speciality fuels alone — amounting to about 11 million gallons — account for more than 40% of the world demand for lubricants and hydraulic control fluids, Williamson pointed out.

The Eclipse normally handles about 200,000 transactions each month. The company also uses the newly installed superminicomputer to remotely develop and support software for the Eclipse C/350 in England.

The DG C/330, which is used as a front end, is part of Chevron's Travel Card System. The firm receives about 600,000 credit card purchase slips daily from roughly 15,000 automotive, marine and aviation fuel dealers across the country. At an average cost of more than \$10 per slip, this amounts to about \$6 million a day in customer purchases.

Emulator Lets 1100 Users Link PDP-11 to Terminal Clusters

SANTA BARBARA, Calif. — Associated Computer Consultants, Inc. has announced a protocol conversion package for Sperry Univac 1100 mainframe users that allows them to link a Digital Equipment Corp. PDP-11 minicomputer to control clusters of up to 31 terminals.

Called the IF-11/U200, the microprocessor-based product emulates a Univac terminal multiplexer processing a number of Uniscope 200 terminals. However, instead of the Uniscope terminals, the product allows the user to attach DEC VT100 termi-

nals or any other Ansi-compatible terminal, the vendor said.

The units can be used in distributed processing environments involving one or two Univac mainframe data bases communicating with PDP-11s at remote field offices, the vendor said.

A basic IF-11/U200 costs \$11,400. If more terminals are needed, up to three add-on X/U200 units can increase capacity up to 31 terminals. A single X/U200 costs \$5,000, the vendor said from 228 E. Cota St., Santa Barbara, Calif. 93101.

Ramtek Adds Graphics/Imaging System

SANTA CLARA, Calif. — Ramtek Corp. has announced a graphics/imaging display system designed to offer compatibility with the company's 9000 systems.

The RM-9450 features context switching, display-list processing, high-resolution fonts, clipping, textured lines, filled polygons, pan and zoom and a single cursor, the vendor said.

Memory configurations provide eight

bits of refresh memory and the system can display 256 colors simultaneously from a selection of 16 million, the company claimed.

The RM-9450 is priced from \$19,450 to \$30,350 depending on resolution and interactive device options.

More information is available from Ramtek Corp., 2211 Lawson Lane, Santa Clara, Calif. 95050.

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Burned by Problem System

Firm Learns Hard Lesson in Mini Buying

By Joan Wolff
And Robert Wolff
Special to CW

Getting "burned" in the selection of a minicomputer system is easy when you are relatively unsophisticated about business automation and naive enough to put your trust in a computer vendor's reputation.

About five years ago, our firm, Rowoco, Inc., a gourmet housewares importer in Mamaroneck, N.Y., bought a turnkey system from a vendor that was relatively new to the computer market. The vendor promised the system would handle our expanding business and equally expanding inventory of culinary tools.

Since Rowoco's roots are as a cottage industry (started in 1965 in a basement with three crates of imported knives), we put all of our faith in this vendor. As a result, we allowed ourselves to be oversold on a system that didn't work.

Because of the computer's failings, our company fell behind in its billing. Our inventory figures became meaningless.

It was only through the efforts



Believing that even the chairman of a company should know how to start a computer, Robert Wolff practices what he preaches by loading a tape reel onto a disk drive.

of an excellent staff, who cooperated beyond the call of duty, that the company was kept on a reasonable keel.

Eventually, the problem system was replaced by a Microdata Corp. Reality computer. But our experience with the first vendor did teach us a few things about computer sales and the dangers of being a first-time user.

Lesson Learned

One of the things we learned before diving into our second computer acquisition was that it is important to find someone either inside or outside the company who is knowledgeable about computers: someone that can hold your hand as you wade through the vendor jungle and examine contracts before you sign.

So the second time around, Rowoco hired a computer consultant who also happened to be a certified public accountant.

In an effort to remedy the problems we were experiencing with our present system, the consultant quickly put us in contact with a variety of computer manufacturers.

Since Rowoco was now doing things manually, as well as using the faulty computer, it was

important to get a new system up and running as fast as possible — especially since we now grossed about \$6 million in annual sales, had more than 7,000 accounts, 1,500 product numbers and 70 sales representatives.

To be considered in the running, vendors had to meet several primary criteria. First, they had to be familiar with our particular operation. We didn't want a manufacturer well versed in one type of system to experiment with another type at our expense.

We also wanted each vendor to be willing to provide system demonstrations and have on hand a number of user references.

The consultant had worked with Turnkey Sales & Leasing Co. With this experience as a guide, he recommended a system designed by that firm.

The Microdata system consisted of a CPU with 64K bytes of core memory, two 10M-byte disk drives, a tape drive, five CRT terminals and a 300 line/miniprinter. The system is presently used in every facet of the company's operations.

Order processing starts with mail, telephone, sales and other orders received at the firm's headquarters. These orders are entered into the system. The system then checks credit and inventory and determines whether it is an open order, pro forma order or back order inquiry.

The system then either rejects the order, issues a picking ticket or schedules it for a future shipment.

Besides billing, accounts receivable and other general business functions, the system tabulates foreign and domestic costs, selling prices and a number of order processing reports.

It also generates a sales analysis program that analyzes entries by customer, product, location and other criteria. File maintenance reports are either issued monthly or upon request.

For Engineering, Scientific Users

Desktop Tops Off DG's MPT Series

WESTBORO, Mass. — Data General Corp. last week topped off its microcomputer-based MPT family by introducing its first desktop computer aimed at engineering and scientific users.

The MPT/100 uses DG's MP/OS operating system and can be used for real-time program development in Fortran IV, Basic, Pascal and Assembly languages. The system has up to 64K bytes of local memory, a 12-in. CRT terminal screen and two disk drives with a 716K-byte total storage capacity.

Although primarily targeted for the technical OEM market, the computer — because of its operating system, compatibility with other DG computers and growth path — is also aimed at technical end users, Rashid Nisar, a senior product marketing specialist for the MPT line, said.

Real-Time Oriented

Unlike previous MPT systems, which are intelligent workstations, the MPT/100 uses a real-time instead of runtime-oriented MP/OS operating system, according to Nisar.

This essentially means that programs can be developed and immediately used on the system rather than having to be created on another computer and down loaded to a workstation, Nisar said.

Also, unlike other development systems, which mostly incorporate the Z80-based CP/M



The DG MPT/100

operating system, the MPT/100 has an interrupt-driven operating system with 16 interrupt levels.

This allows the user to see the program in action as it is being created, Nisar explained.

In addition, the MP/OS operating system is more technically and scientifically oriented than the commercial-based CP/M language, he claimed.

For communications to other computers, the MPT/100 has two RS-232C programmable synchronous/asynchronous ports that combine with extensive software, languages and utilities to emulate most standard industry communications codes. Eventually, the firm will incorporate this communications compatibility into hardware rather than software, Nisar said.

The MPT/100 costs less than

\$6,000 and will be available in October from DG, RT. 9, Westboro, Mass. 01581.

Interprocessor Link Ties PE, DEC Machines

ANAHEIM, Calif. — Macrolink, Inc. has announced an interprocessor link for Perkin-Elmer Corp. and Digital Equipment Corp. processors. The firm also announced a group-coded recording (GCR) magnetic tape system for PE processors.

The interprocessor link is a self-contained unit on an embedded half board. It is fully compatible with DEC's DA11-B processor-to-proces-

sor link and supports all status and control information data required for implementing the word and block transfers supported by the DA11-B link. The unit costs \$2,000.

The GCR 6250 consists of one to four tape transports, an expandable formatter/controller and a half-board host adapter. The GCR tape systems cost from \$29,500 from 1150 E. Stanford Court, Anaheim, Calif. 92804.

MINI WORLD



Photographed on site at Source 2 International, Santa Clara, California.

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And, through working with intermediate system customers, we've learned that this balance is truly critical if the full potential of a 4300-based system is to be utilized.

Our intermediate peripheral subsystems will give you needed balance. The STC 4500 family of tape drives, for example, offers 6250 BPI

performance and speeds to 125 ips. Besides packing up to seven times as much data on a reel as conventional drives, speeds and densities can be upgraded at your site for maximum flexibility.

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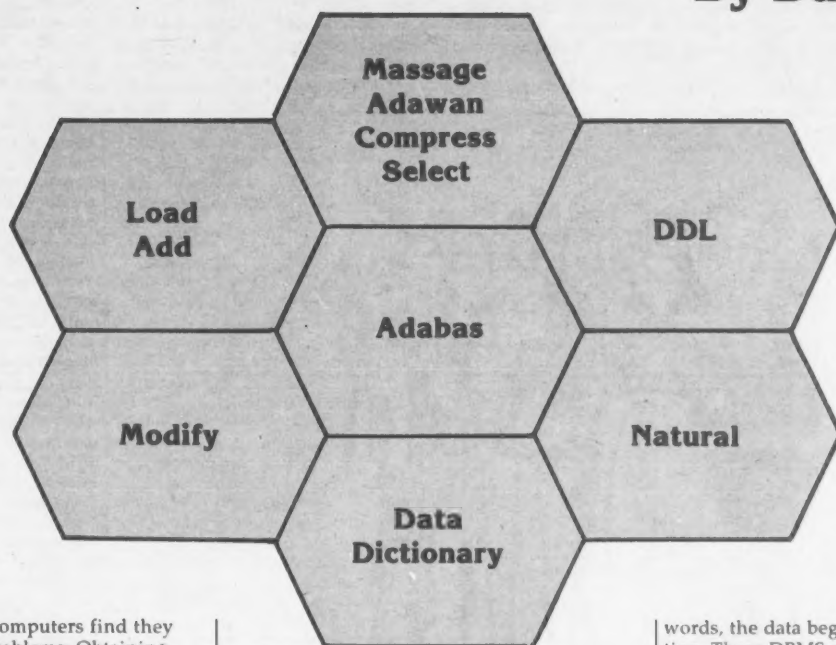


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Natural Project Control

By Dan Nolan



Those who purchase computers find they really have only two problems: Obtaining the resources necessary and paying the bills.

We computer professionals find our problems to be of two basic types: Getting the systems to do what is necessary and not breaking our budgets.

When one of these four areas causes problems, we often find we have bitten off more than we can chew. The other three immediately seem to move in such a way as to block any change. Our efforts to reduce cost in one area contend with the other areas, giving us more problems or resulting in sheer impossibilities.

Inertia also causes problems. When a system representing a sizable investment in labor-years of development is discovered to be an utter pig in operation, improvements may not be practical because of the effort required to redesign and change the code. Had the programming investment been less, the better solution might have been adopted. Instead, less effective compromise is employed.

This paper has been written with the intent of bringing the development process under control, not only to improve the accuracy and reduce the cost of applications, but to allow us to concentrate on more technical performance aspects. Other, better papers have been prepared on improving these other factors, such as effective data base design, optimum machine configuration or techniques. By relaxing the pressure for accurate systems, we gain the opportunity to apply some of the recommendations in those areas.

The problem of getting a project done on time, as required and at cost has been called by various names to imply legitimacy. Management, scheduling and coordination are words that imply we have things well in hand and that allay any fears the client might have.

Let us not forget our objectives are like the chess master's: To control those variables that determine success or failure and to become, by choice, successful. "Control" used in this context implies that the resources necessary to conduct an effort are present (management, machinery, money and so on) and will concentrate on using the language Natural as a tool to perform the work. Needless to say, Natural and Adabas are considered "givens."

What Is Natural?

The progress of software technology during the first few decades concentrated on getting the most out of the machine. The first languages enabled us to convert information from human form to machine, then wrested the data from storage and beat it into comprehension. The level of effort required to do this was tremendous and many languages and procedures were developed over the years to make this less of a task.

Only when the data was "stabilized" by effective data base management systems (DBMS) did the nature of the data coincide with the mechanics of storage. In other

words, the data began to resemble information. These DBMS employ an active data dictionary ("active" in the sense that it exerts control rather than merely reporting on status) and integrate the data characteristics with the syntax of the language.

With any language, nouns are described by adjectives and acted upon by verbs in accordance with instructions given by adverbs. Computer languages employ data names as nouns and key words as verbs and adverbs. When a dictionary is involved, the character of fields become available as adjectives, and logical operations are possible to permit elaboration and prohibition.

Just as violating the rules established by Webster's Collegiate will result in an unsatisfactory grade in school, a violation of the rules established by the data dictionary and language should give an unsatisfactory response. The quicker the medium, the faster the response, until the language is able to intercept invalid code at the terminal and prevent it from being written.

These modern languages are called fourth-generation, very high-level and nonprocedural, among others. They share the ability to define the data in one place for all programs, providing descriptions for coding and establishing credentials for processing. Because the file design reflects the active state of the data in a DBMS (rather than the passive storage of other file designs), most of the logic necessary for access and retrieval is available by default, eliminating most of the code necessary for I/O and control logic.

(Continued on In Depth/2)

NATURAL PROJECT CONTROL

In Depth/2

IN DEPTH

(Continued from In Depth/1)

These languages have given extremely good results in the relatively short time since their introduction. They are well on their way to establishing their existence as fully as more conventional languages, such as Cobol, and are seen by many as their replacement. In fact, the only arguments against the Natural languages replacing Cobol focus on the large number of existing code and the relatively undeveloped state of

the new languages. Both arguments will be answered in time.

Accurate Forecasts

Anything can be predicted with accuracy, except the accuracy of predictions. The problems we encounter when we profess to have control of a project result from clients having heard it all before and their embarrassing ability to recall past promises.

Until we can accurately predict the

cost of projects in terms the user can relate to and understand, our credibility will continue to suffer and our competence will be questioned. It is too easy to secure a contract by agreeing to a schedule that is pleasing to the client. We compensate as the inevitable delays arise and hope for the best.

What is needed is a method for making estimates in a manner that clearly expresses costs to the client and establishes schedules that can be

met by those developing the systems. We have stayed one jump ahead of the sheriff for too long a time.

Perhaps we can take a page from the book of those who make forecasts daily and for a living. Our choices include astrologers, palmists, economists and weathermen.

Forecasting has always been an inexact science, regardless of the area to which it was applied. Meteorologists began using percentages to give the appearance of precision in their predictions and thus instill confidence in the public. Data processing has had its problems in the development of new applications, and perhaps we can benefit by using the weatherman's percentages to gain a measure of control and confidence during project development.

When the weatherman predicts a "10% chance of rain," the accuracy of this is a formula that includes not only calculations, but past experience. If, in your experience, he is correct 70% of the time, the chance of rain on your picnic will be 30% of 10% more than predicted, or 17%. The chance it will rain more is an additional 30% of the remaining 90%, or 27%, for a total likelihood of a 54% chance of rain. Similarly, the likelihood of no rain at all is somewhere between 54% and 46%, depending on the weather. While this discussion is fallacious, the arguments proposed are relevant to data processing.

Productive Efforts

With all the variables to consider in developing a DP system, we have yet to be able to differentiate between effort that is productive (the physical definition of the work), and those efforts that are less than productive. By reducing the technical complexities of the development process, we can evaluate the worth of certain activities rather than the effort needed to enable us to make decisions on the basis of expected results rather than on hopeful expectations.

Adabas DBMS and very high-level language Natural give us a measure of control over some unknowns that have been blamed for our inability to predict accurately the development of automated systems.

By accepting these capabilities and incorporating them into the foundations of systems, we reduce the tasks of data and language to known quantities and can predict the levels of effort required for each function based on our experience. We will then be able to concentrate more on the known problem areas and choose which of those areas to resolve on the basis of getting a higher return on investment of resources. We will also be permitted more leeway in dealing with unforeseen, unforecastable problem areas as they arise.

Unless we choose to be insufferably arrogant about the superiority of our skills as DP professionals, we will admit that, at times, we are less than perfect. Accepting this allows us to state that developers of systems —



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the analysts, designers and programmers — can be only so accurate, and all time and skill applied will result in this level of accuracy, more or less depending on circumstance.

The balance of the ideal, the 99.9% perfect system, is achieved only through experience gained through testing, training and actual operation. It represents the inherent expertise of the end user and will emerge only after he has had a shot at the system, generally after the mistakes have been made.

If we set this "attainable" level of accuracy at 80%, judge it to be adequate and incorporate into the design the ability to recognize, capture and apply the remaining 19.9% as each facet emerges, we will be able to predict with a certain degree of accuracy our 80% target and give ourselves a 20% buffer in time and flexibility to allow for the remainder (see Figure 1).

Setting out to develop — analyze, design and program — a system that is 100% accurate before we start can be an exercise in futility. If we find the first 100% of our effort has produced 80%, we will need to expend just as much effort in attempting to capture the remaining 20%. Because we are able to do this successfully with only 80% accuracy, we have collected another 16%, for a total of 96%.

Since we promised the client at least 99.9% of the requirements, we again redouble our efforts for the little remaining, only to discover we have garnered just 3% more of the system at another 100% of effort. This gives us an overall accuracy of 99.2% at three times the cost involved had we aimed at an initial 80% and provided for the balance later.

The Elusive 100%

In our pursuit of the elusive 100%, it is not uncommon to find our systems do not have the flexibility to react to change. With something akin to arrogance, we consistently establish specifications based on the assumption that every part of the design is correct and complete as it stands and will remain forever.

Should there be a flaw in that assumption and should an error emerge or a basic requirement change, there will be no provision for the system to recover gracefully. If our design has missed some of the elusive 19.9% that comes from experience, it can be expected to appear later as an error or flaw in the design and to continue to haunt the client for as long as he uses the system.

Aiming at four out of five is not avoiding the problems of systems design. Over the years we have come to the realization that our very best efforts will be less than perfect even as new techniques in software development drive the costs up. Expecting the unexpected and being able to handle unknowns as they arise gives us an edge on accuracy we did not have before and places the costs directly on the effects so that a sense of

value can enter into the decision-making processes.

We are improving our forecasting accuracy by eliminating the possibility of snow in Florida this summer and concentrating on weather that can be expected to give us problems.

User Involvement

Until fairly recently, it has been almost as though we did not want the user around while we were spinning our gold out of straw. The time and complexity required for even the simplest tasks dictated that we operate in an unsympathetic vacuum while the world waited for our miracles to emerge.

Times have changed. Our jobs are becoming more visible. People have not only accepted the computer, they depend on it. Languages and tools are better and free us from much of the detail in programming. We can concentrate more on the effectiveness of our work than on the problems of "getting it to work."

Unfortunately, this simplification has exposed us to some criticism, as when the boss' child duplicates a megabuck system on his home computer over the weekend.

We can utilize the exposure of our tasks in a profitable way by taking advantage of the simpler languages and faster response. We are now able to use our clients in the development cycle without exposing them to the confusion and frustration of the past.

In fact, user involvement is necessary to interpret and evaluate each element of the design as it takes form. Our modern philosophies call for the user to be involved in each step of the development process, but we are at the point now where we can use much more.

Active participation by the users as members of the development team will not waste technical time in details as before, but will free technicians to ply their craft as the users apply their skills to their field of expertise.

Programming languages are at the point at which programming can be done faster than the problem is defined, so the only person who can define problems fast enough is the one who does so in "native tongue," without need to interpret or to engage in an education process.

Any user assigned to the project will find himself as effective in the project as the most knowledgeable programmer; his language, his expertise will be spent in contributing to a project, not just waiting to evaluate sections as they are completed.

Getting the user to devote enough time to the project is often the biggest problem confronting the developers. It is extremely frustrating to know the solution to a problem that took three weeks of analysis or that emerged at an embarrassing time was in the user's head all that time, and they just assumed we knew about it and were waiting for us to

(Continued on In Depth/6)

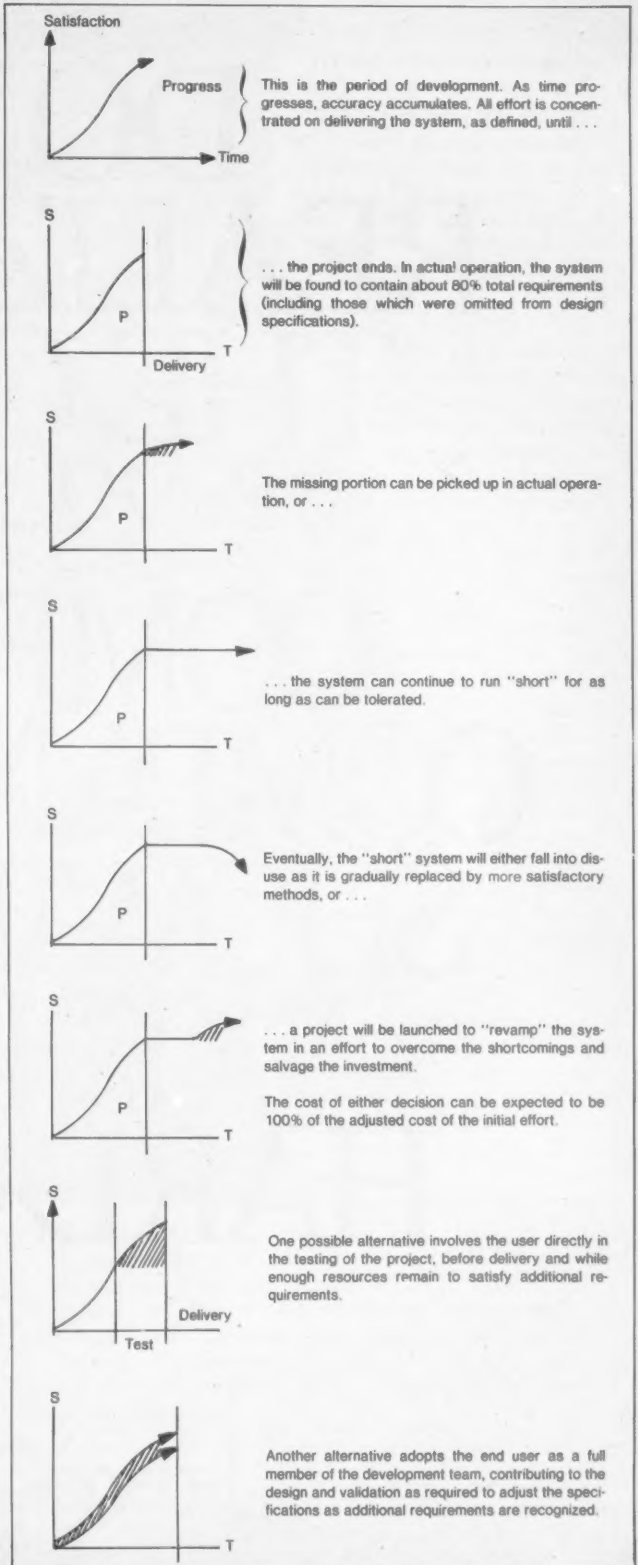


Figure 1. The System Development Period

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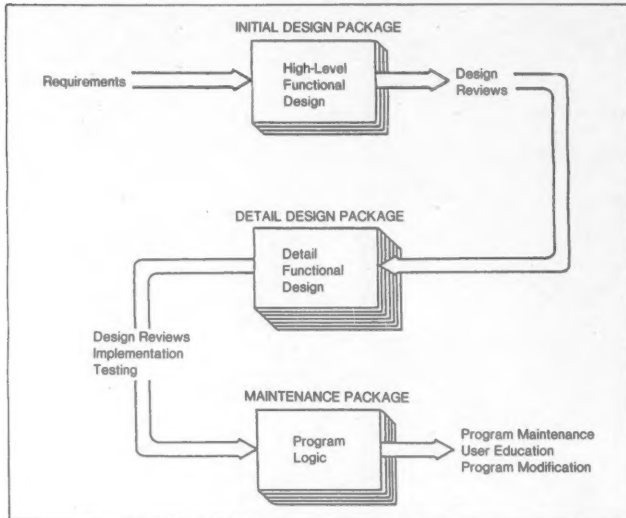


Figure 2. Using Existing Tools for Design and Specification

(Continued from In Depth/3)
present it to them.

The best way to get active user participation on the team is to insist on it and justify it on a cost-effective basis. Having one of his people assigned to the team is one of the best investments your client can make, even if it means rearranging his work schedule to do so. To do less is to invite overruns, delay and design problems. With the user as a team member, a new dimension is added to value judgments, decision-making can be based on an appreciation of the work involved and the final product will be easier to operate and maintain.

The objective in getting the users involved is to have their expertise as a committed resource, available not just for information, but for a fair share of the work. Ideally, the user should be assigned to the project development and released from other commitments. The result will be well worth the expense.

In the absence of actual user involvement, a "user advocate" can be included in the project team. Former Marine Corps drill instructors make good candidates.

Assuming the contract is not for developing a new design methodology, we can then feel free to use any means at our disposal to adequately

assist in the process of design and specification.

We will try to avoid reinventing the wheel, but may bend it into some interesting shapes as we go along. Our first steps are to define in general terms the tasks before use, to assess the tools that have been developed and to select those that appear to suit our needs (see Figure 2).

A development document that serves well is a loose-leaf project notebook. By its nature, it is easily modified and not resistant to change. We want it to be easy to change so we can catch the missing 19.9% of the definitions as they emerge and incorporate them into the design from the beginning.

The functional statement will be handled with a visual table of contents (Vtoc), followed by statement of work giving a description of each feature specified. A modification of the systems flow diagrams to treat processing rather than programs will provide a basis upon which to determine the operation of the system.

Program specifications will be effectively made using the hierarchy, input, process, output (Hipo) format, while eschewing the esoteric pseudocode in favor of the more understandable English, arithmetic and Natural expressions.

As the tools are selected, so are the controls. Whatever names will be used in the documentation also should be used in the actual systems, be they for data, programs or operations.

In much the same way, standards and conventions are defined to govern the style and appearance of the Vtoc, numbering it and having the corresponding Hipo pages use the same numbers and names so that it becomes a true table of contents.

The balance of the tools will be left pretty much to the development team, with one requisite: That everything be clear to everybody, even to the boss and the end user. If there are any questions, the explanation is included or the part is rewritten.

Purpose of Vtoc

The Vtoc depicts the functions of a system in the form of a corporate organization chart with each discrete operation occupying a box connected to related operations, subordinate to controlling requirements and superior to dependants.

The objective of the Vtoc is to portray the design as a completed form to those best able to evaluate its functions. The Vtoc that concerns itself with the external appearance of a system in almost all cases will be contained on a single sheet of paper.

Should the design seem to carry over onto additional sheets, each of the blocks will be examined to see if "method" has crept into the functions. A Vtoc entry should concern a capability, not the means whereby it is accomplished. Most problems in systems originate in this early stage, where prejudices and fears enter and

take the form of methods masquerading as requirements.

For example, there may be a requirement for an audit trail as well as for an historic capability. Although the design team may have had great success in combining the two, they should remain discrete entities. Representing them as a hierarchy with audit and history as subordinate to an audit/history item is to invite confusion, as the capabilities required of audit will be represented by a third and fourth level of operational requirements such as capture and interrogation.

Another reason for avoiding the injection of methodology into the Vtoc is that requirements will not be removed by simply ignoring them, and the temptation to avoid or seek alternatives to potential problems exists at all levels of the design. The objective of the Vtoc is to state the needs of the system, regardless of how difficult or complex they may be perceived, in order to deal with the complexities at time of design.

The Vtoc itself is simply an attractive, accurate picture for reference. Each entry will require further explanation, definition and design. In the Vtoc, standards and nomenclature should be established that will be followed in the remainder of the development. Vtoc entries are assigned numbers that will be used by the other tools, and the names used will be carried through documentation and into the actual code and screens of the completed product.

Statements of Work

The Vtoc is followed by full explanations of the Vtoc entries. This document is an explanation of the diagram, with a section devoted to each entry. As when the diagram was laid out, care should be taken to avoid polluting the descriptions with irrelevant problems or past experiences (see diary, below).

This is neither the time nor the place or vehicle for the introduction of technical brilliance or personal bias. Practical considerations will emerge and be resolved in the formal walk-throughs, with objections from both users ("My people will never stand for that!") and from developers ("That will increase your programming costs by 300%!").

Likewise, the biases of the clients should be removed from this document as well. An example of such bias is reflected in the following statements taken from an actual case:

- "All errors will be detected and presented for correction as close as possible to their point of entry."
- "No error will be presented on-line which can't be corrected on that screen."
- "All errors found in a screen will be presented at the same time."

With this last criterion, the specifications just went off the edge of the world. Instead of concentrating on what had to be done, they described how it was to appear. The objective

"Are you using NTO for ASCII support in your SNA network?"

"NTO?! ARE YOU KIDDING? WHEN PCI's 1067 OFFERS SO MUCH MORE FOR LESS MONEY?"

"What do you mean?"

"The 3705 memory for NTO is outrageous. But PCI's 1067 is the same as any SNA/SDLC device. And what about being limited to one port per ASCII terminal?"

"The 1067 can support more?"

"Certainly. How about 7 ASCII terminals? ... or 14? ... or 21? On a single 3705 port! And what about your APL problems?"

"You mean there's really APL support?"

"You bet! And you can run graphics terminals like Tektronix's and Cal Comp's. All those great ASCII graphics terminals. ... up to 9600 Baud."

"Wait a minute. What's this 9600 Baud stuff?"

"That's right. From 75 up to 9600. And I'm sure you know that NTO can only be installed in a 3705, but you can put a PCI 1067 anywhere."

"At the central site or anywhere I have SNA lines? Even with auto answer and speed detect?"

"Yep. And no more limitations to TSO. Now there's TSO, IMS, CICS, VSPS. ... everything."

"Yeah, but how long do I have to wait for a PCI 1067?"

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of finding all problems and of prohibiting a paradoxical screen that could not be corrected has been overshadowed by concern for the appearance of the screen. Program constraints have been introduced that the developers will have to design around.

Dear Diary...

The objection to disregarding what are undoubtedly important considerations that arise from the creative processes in design as irrelevant, are the fears that if never defined, good ideas may be lost forever.

We did not advocate discarding "other" or "additional" considerations. We stated that processes that could not be considered essential to the design of the system after an objective evaluation would be removed from the Vtoc and statements of work.

Innovations that arise during the process of definition can be either of two classes: necessary or nice. Those thoughts that are necessary undoubtedly contribute to the missing 19.9% of the problem and should be included.

Those classed as "nice but not necessary" (we will discard the possibility that the design team might come up with a third category, perhaps "incredible") will be themselves of two types, extensions and techniques. Extensions are modifications to the system design above and beyond the initial request and budget. Techniques represent the algorithms we DP-types have come up with over the years as problem-solvers and labor-savers.

A diary or two should be given to retain these niceties for incorporation at a more opportune time — while incidentally preserving egos, providing an easy way to avoid conflict and get on with development.

Data Design (Two Words)

As soon as the functional statements are agreed upon, the development team has two discrete areas to concentrate on. The first is the definition of each data element necessary for each of the functional requirements. The other is the actual configuration or operation of the system itself.

Fortunately, the design team has two corresponding resources to take care of these different areas. The client is a user resource with expertise in the real world of application, and the developers themselves are experienced in the elements of computer system design.

At this point, it is proper to separate these operations for a brief time and allow each to concentrate on their areas of expertise. They will merge again when the products of the user are given life by the efforts of the developers.

The DBMS, Adabas, will be installed and operational at this time. This is *not* an option. The project will have more than enough problems

without additional variables on the technical side. DBMS tools that should be in place are:

- Data compression (Adawan) with user exit for laundering and selection.

- Data definition language (DDL). This is a single language used by the designers — both user and technician — to lay out the files. The resulting description directs specification for the DBMS components (files, dictionary and language) without duplicating effort or having the same information in more than one place, in more than one form. Fortunately, Adabas' Adawan control cards are already in an ideal format for this and therefore become our DDL.

- An active data dictionary. It should be established so as to remain in synchronization with the data file definition. This is accomplished easily by using the same specification cards given to the data compression as input to the dictionary. Util6 is the feature that accomplishes this. Util9 follows by automatically loading the data definition modules for Natural for each file specified.

- File loading (Adald1/2), first with the DBMS inactive, then, if time permits, in parallel (able to load without bringing the DBMS down to do so).

- The ability to add records to files (Adadz1/2) to enable us to increase an existing file as well as to split a large load into smaller segments.

- Modification of field attributes is done through the DDL or, for more radical change, with the utility Adahd1/2. Super-radical changes will use:

- Reorganization or its equivalent, to completely unload a file, decompress if necessary and reload as required. The sequence of Adauld, Adald1/2 and Adauld, Adadec, Adawan and Adald1/2 are established here.

- A periodic backup/restore facility to protect the development team from themselves. All the standards in the world will not prevent a human error, and the design effort can pause for a moment to bludgeon the person who destroyed the test file, but should not suffer a setback.

- Similar means to save program code periodically, automatically and/or constantly, again to protect the development team from acts of passion.

- Elaboration of the standard utilities for situations peculiar to the team (such as reports on ownership and use of the data), programming standards and conventions and other considerations can be facilitated with user-written software. Adequate tools often can be obtained from other users until such time as they are provided by Software AG.

- Since Natural currently focuses on facility more than on control, the development and production environment will have to be established in the form of standards, monitored with the above tools to avoid con-

(Continued on In Depth/10)

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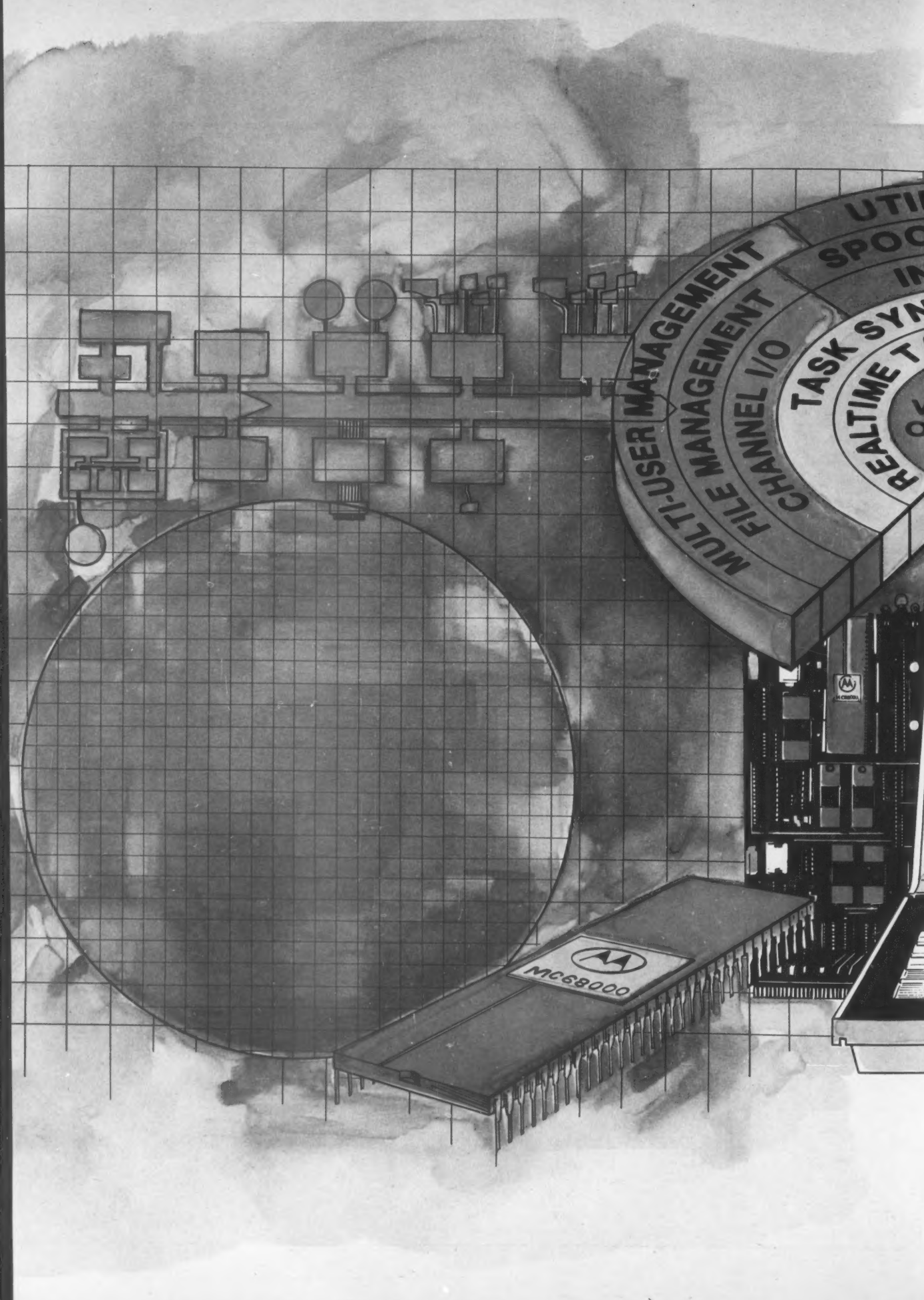
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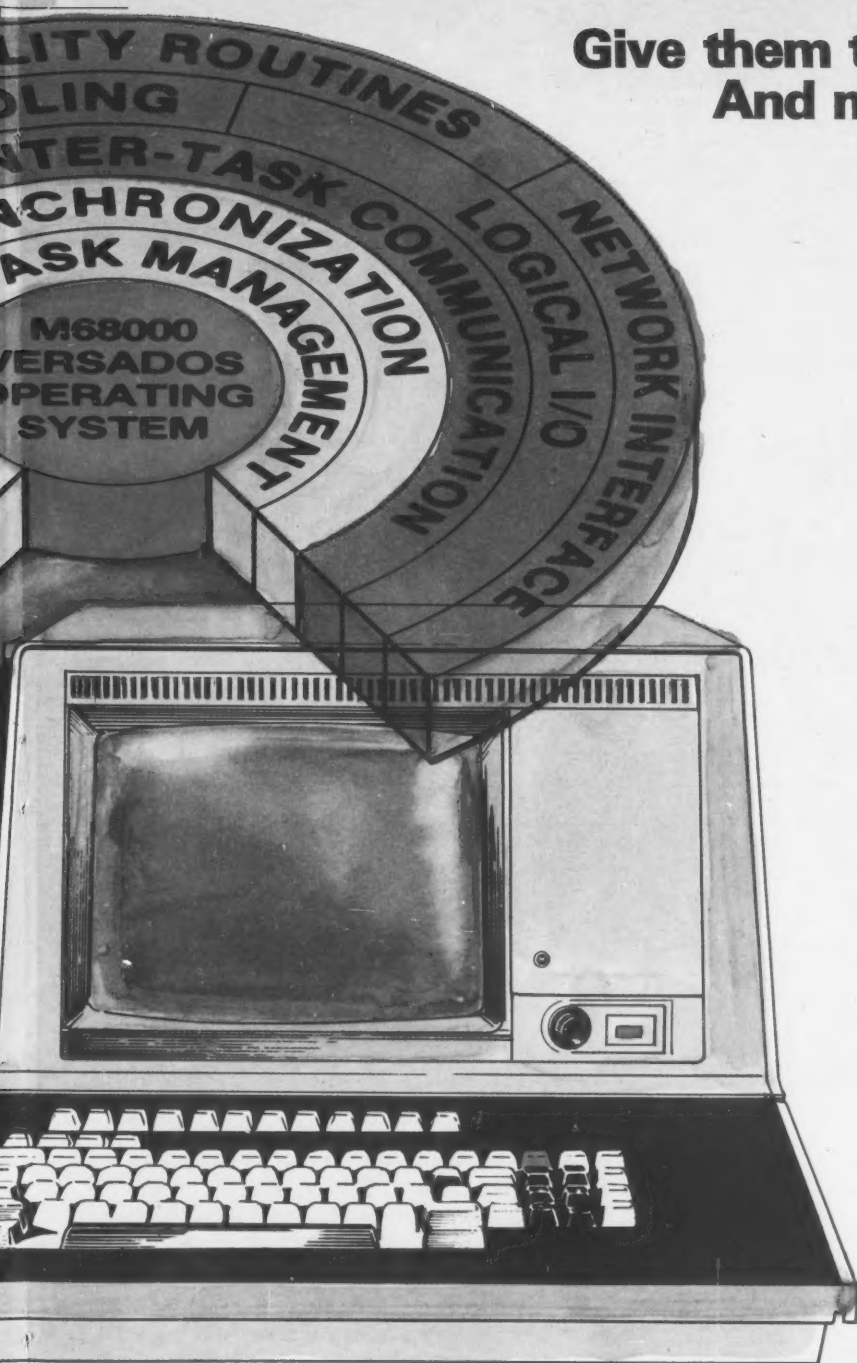


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IN DEPTH

(Continued from In Depth/7)

flits between different projects.

Because the user has contributed so much to the requirements in the Vtoc and the statements of work, he is in a great position to work with the developers in declaring the data fields to achieve these tasks.

The DDL described above is an excellent format to let the user and technician work together, because each line describes a single element, with the generic name to the right

side and the technical description of the field to the left. This will be a learning process for both, as the user imparts his knowledge of the character of data ("The date is required by law. If it's future, it's projected, otherwise...") and the developer describes the capabilities of the DBMS ("... and if we make that a null descriptor, selection becomes automatic").

As soon as the data is established and the flow is defined, the files

should be loaded. Although this would be premature in most other methodologies, here it provides the development team with a veritable cornucopia of benefits:

- The validity of the design can be evaluated.
- Team members unfamiliar with Natural and Adabas can gain hands-on experience in both, as well as with the proposed file design.
- Examples of input screens and reports for program specifications are

prepared more easily with Natural than by other means.

- Such examples will be operative and will reveal problems before they are fixed into program specification.
- Benefits emerge as automatic features are discovered and adopted in the system.
- Questions involving choice of techniques to employ will arise during design. By trying each alternative and examining the results, these can be resolved in less time and with more certainty than by debating the merits of each.

• Illustrations and experiments are functional and will serve as "living examples" to the user during the structured walk-through.

- These samples can be preserved and incorporated into the actual program code, with the client's blessing.
- Routines and procedures to load the data and dictionary are established. The ability to rapidly modify design becomes a recognized development tool. There is less of a tendency for the team to "live with its mistakes."

A lot of activity occurs as a result of the early loading of the data files. A caveat is appropriate at this point to ensure effort is not wasted: There will be a great deal of enthusiasm, and the temptation to begin on the actual programs without delay will be strong, but the program specifications have not been completed. There is a real risk in coding more than is necessary to realize the above benefits and in considering the code produced as a product rather than as an investment. The actual products are design and capabilities.

The coding is not important: the value comes from what the exercises produce.

The Flexible File

This first load of data is tentative and will be subject to wide extremes of change as the specifications are developed. The effort spent in bringing up Adabas is time well spent because it will not have to be repeated for future projects.

The data base administration (DBA) should be prepared to provide a series of routines using the tools to make adjustments to this preliminary file as they are needed automatically, or to become a member of the development team. In either case, the DBA will have to acquaint the design team with the means by which the methods are employed so they can avoid specifications that resist easy change.

The DBA will take a final look at the design prior to bringing any volume of data up and can expect to make a few transparent changes in design — possibly making a complete overhaul to remove traces of false starts and discarded fields — before full conversion or implementation.

Flexibility is the primary key to being able to deal with the missing 19.9% of the system as it emerges. The ability to both adjust the design

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to change (rather than compensate for it with code) and not to interfere with existing programs allows us to incorporate the unexpected in an almost casual manner.

Data (Program) Design

The second area of concentration by the development team concerns (at last!) the programs themselves.

Using the conventions established by the Vtoc for names and numbering, a system flow diagram is drawn up, depicting activity in much the same way used to describe the flow of data through a batch system. This diagram, like the Vtoc, is simple enough to explain to all levels of users, but in this case it portends that meatier substance is about to follow.

Each activity portrayed in the system flow document will be described in detail. To do this effectively, we borrow another tool, the Hipo document format, and use whatever does the job to elaborate and more clearly define it. We will not use a pseudo-code technique, because we have the language and structure to test and portray the more complex processes with our tentative or test data base and description.

The Hipo diagrams are prepared using a single page per process. If we need more than a single page, we have defined more than a single process or are going into too much detail. We will then reduce the offending Hipo to a more general definition of a series of separate processes and use subordinate Hipos for each of them.

Each Hipo page is of three vertical sections: Input, processing and output. Pages are numbered and titled according to the Vtoc. For subordinate processes, numbers and titles reflect their status as a further breakdown of prior pages.

Input (left column) depicts files and fields as boxes within boxes. The source of all fields will be shown, whether they come from the data base or result from other functions. In either case, the nomenclature used will be consistent with the Vtoc and all other work done. Automatic systems functions (date, page, counts and totals) will be represented as if they were existing data resources.

Processes (center) state activities to be done by each program in clear terms. The language used is whatever does the job. Generic terms might be employed in the user's terms, algorithms and mathematical formulae might be used and, in some cases, Natural code might best describe what is to be done. Frequently, when the processes are too involved, supporting pages are included behind the Hipo in the form of decision tables, logic diagrams or copies of source or legal documents. Each process is reviewed by the team and any confusion cleared up. As before, all terms used follow the agreed-upon conventions.

Outputs resulting from the processes of inputs are shown to the right as

fields within files, interim elements passed, functions or reports. Again, these follow the names used. As a courtesy, the destination is indicated, whether to a file or to another program.

Following the Hipo are the supporting documents, in any of the forms mentioned above. When an external document is referenced, special notice should be made that control is outside the sphere of influence of the project. This ensures that obso-

lete or dated material will not be included as precise data (as in the case of salary tables) and that a programmer will properly research the source of the document if the values are needed.

Programming (at Last!)

The development team now has everything it needs to begin programming. The specifications are clearly laid out from beginning to end. The user or his advocate is still on board

to test, and the data base has been defined for programming. Now, you can start. A good technique uses still another page from the past, the "stub" programs. Top-down programming, behaving as though dependent functions were present and providing for them later, can begin, with the details filled in as the project proceeds.

Changes and problems will be minimized if you used Natural to test (Continued on In Depth/12)

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IN DEPTH

(Continued from In Depth/11)
complicated operations and to provide illustrations of reports and on-line screens. Those that do occur from oversight change in specifications and as a result of the almost-forgotten 19.9% can be incorporated at any time without doing serious violence to prior, unrelated work.

The DBA tools and flexibility are invaluable now. Elasticity will be required as additional fields are required and as capabilities become evident. Having this resource means code will not have to compensate for design. In fact, code should be scrutinized for just such instances, because compensation might indicate not only that the data is misbehaving, but also that the design missed something or that there is a conflict between the functional statement and specifications. Occasionally, such problems arise when a paradox for which there is no real solution is encountered, and the best course is to reopen the area to analysis.

Fortunately, Natural is data-driven and will indicate that there is compensating code by the presence of switches and flags, indicators outside the data that are used to indicate the contents of the elements. The programmers will soon find such spurious fields necessary only in exceptional cases and will be able to question each case as it occurs.

Standards should now be an established fact. Those remaining to be set will deal with the style of the code as it is written, indentation, Natural features and with which of the synonyms for functions (for example, MAP vs. INPUT) to use consistently. This is where individual ego and creative license are given free rein. Standards for data and program names were established in the beginning, and compliance becomes more of a pleasure than a chore.

Documentation

The objective of the Hipo is to give direction to program documentation. If this is accomplished, the project notebook, with its Vtoc, Hipo and supporting documents, forms the most accurate system documentation possible.

If you have constructed a project notebook to contain the Vtoc, Hipo and so on and have updated and replaced pages as the project developed, you not only have a means of evaluating the progress and accomplishments of the programs, but also have avoided a separate documentation effort.

If you have succeeded in getting a user to participate in the project from specification through data design to program testing, you have the perfect author/editor of the user's and operation manuals.

The activities presented in this approach can be scheduled to make best use of existing resources. With a small team, each task will be performed in turn. With more resources, activity can be interleaved so ele-

ments are developed without regard to the status of others.

Further breakdown in development is possible, with some functions being programmed before others are defined. The ultimate example of this has the system actually going into production before work has even begun on other parts.

The more complex the interleaving, the greater the need for control. No amount of flexibility can resolve with complete ease a major design

problem involving a large amount of live data. Complex development activity with many diverse activities going at the same time should consider more emphasis on project control and allow for considerably more overhead in applying design changes and in providing for data integrity. Care in planning will provide most of the security and reduce potential catastrophe to minor inconvenience.

One of the last tools is the Worst Of

All Possible Conditions (Woapc) of game strategy. Providing for Woapc will provide the capability to recover from anything less. The client is advised of the ethics of the situation and allowed to determine at which point he will budget for it. He has several options:

- Consider Woapc an acceptable risk and pay the price if it happens (deferred cost/gamble).
- Include provisions for it in specifications (security).

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• Reschedule the project or increase staff (avoidance).

Whatever the outcome, the user was made aware of the situation and, with your recommendations, has made the decision he can live with most easily.

Evaluation

We started with the premise the system would be begun when we had 80% of the requirements nailed down and we would provide for the

emergence of the remaining 19.9% during the course of development. The question now is, how do we know our system is 99.9%? We need a final effort to be certain all significant factors have been captured and the system itself does not contain the seeds of its own destruction in the form of contradictions and fallacies.

The system and its data have become individuals by this time. Each file, each record in that file and each routine of every module in every

function have a personality and Bill of Rights all their own. Behavior in actual operation can be expected to differ from our original, well-mannered design. The entire system should be examined at length after installation, when training has taken its toll and after a decent period of operation. Adjustments will have to be made, but if the budget includes expenses for periodic review and tuning, the cost will be painless.

This paper is presented at a time

when there are no other, more formal, guidelines or writings on the use of any DBMS/VHL such as the Adabas/Natural combination. In the course of the past 30 years we have found that techniques that are effective under one set of circumstances can be more or less so under another. Until the Natural languages become more accepted, we must rely on communication with the vendor and with other users to contribute to the direction of development. The following observations are given in that spirit, more as a result of the new concepts introduced by Natural than from the capabilities of the language itself:

- Data integrity is not an automatic product of either Adabas or Natural, but is the measure of good design. Circumvent this and integrity is threatened. Quick and dirty (short & sweet) program activity can be most unfortunate; a formal, structured approach is as essential now as it was in the past. To develop a system without it is to risk developing something that lacks control and documentation, is extremely difficult to maintain and may have no purpose.

- The Adabas/Natural project control philosophy can be used even when the system is not to be on the DBMS. Assuming the DBA tools described are already in place, they can assist the development team in defining specifications and establishing criteria. Also, the user is able to review an actual model before work is done, which will largely consist of replicating the approved design in another language and file method.

- There always remains to be found part (19.9%?) of the system. The earlier this emerges, the better for all concerned. Testing becomes a particularly active and important function. The objective of testing with this philosophy is not to prove something works, but rather to find those cases where it does not work. The collective ego of the development team will have to be resilient enough to view problems as challenges rather than viewing them as aspersions on its analytical skills.

- Systems protocol should be followed for each function. Validation routines established for entry of data should be exercised in all other forms of update processing. This makes changes to applications programming retroactive.

At present, Natural provides little control against proliferation of code. A large number of programs require complex management procedures that must be established by the team. A single function in a single location serving multiple purposes will be more easily controlled and maintained. Control becomes a function of design rather than a burden to the development and maintenance teams.

- Because Natural is so different, developers might forget to apply proven programming practices while

(Continued on In Depth/15)

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IN DEPTH

(Continued from In Depth/13)

they are in the learning curve. These include the use of literal values for variable criteria, rather than a table maintained by the user as an adjunct to the system. Although the individual programs will be simple, a system with many modules will be just as complex as one written in a lower level language, and changes to source code should not be placed in the user's domain with the completed system.

- On the other hand, Natural uses some of the same words as do other languages. Although similar code can be constructed, it should not be done without consideration of the Natural data-driven processing.

Examples are statements such as AT END OF DATA ... and IF NO RECORD ... If the language "stops" at the last record and ties up all the loose ends, and if the code will be operated only for the records specified, these are exception functions, not the processing control needed by other languages. Natural is structured and data-driven and will not react kindly to attempts by a programmer to "second-guess" it.

- A proliferation of flags, switches and intermediate holding areas is an indication the developer is attempting to duplicate another language. Natural code will generally react to data, to its presence or absence, to whether it is correct or wrong, appropriate or not. Because most processes take place when the record is present, the need to save data for later reference seldom arises.

Complicated code becomes, then, the result of complicated specifications.

- Natural has an inherent three-dimensional capability in the Adabas structure. Should specifications call for the more conventional form found embedded in each program, it would be only fair to warn the client of the cost and risk associated with combined languages and let him adjust his needs, budget or schedule accordingly.

A single array is given by using the INDEXED option against variables or against fields in the record, or of processing a variety of working formats.

A two-dimensional table can be built using several methods. Usually, a work record is defined as having Multiple-value fields with a PERIODIC group. This has the occasional overhead of processing if saved, but, when saved, it can be used by multiple programs and can be retained for problem analysis and reprocessing.

At times, the automatic system functions (such as SUM and TOTAL) will entirely eliminate the need for separate tables.

Three-dimensional tables are constructed by having several records in two-dimensional form and accessing them accordingly. In addition to the benefits described above are other considerations, including the courtesy of providing each record with an indication of its source and time and

of clearing the file before generating a new matrix.

- Natural was designed to call attention to errors, one at a time, on the screen. Frequently, specifications call for all errors to be shown at once for the entire screen. This can be done with Natural, but at a significantly higher cost in terms of programming and execution.

As in the case of the dimensions above, the client should be advised of the problems involved and given

the opportunity to make appropriate adjustment.

Arguments can be made for either mode of operation, but the resistance to "pinballing" through a screen one error at a time seems to come from the user's experience with batch processing, where one field would be corrected and resubmitted only to have another appear the next day.

Neither method will prevent a correction from causing other errors, but when the process is on-line,

there is little delay in moving from one error to another.

- History is a fact. Only in certain countries can history be changed. Preserving the sanctity of history will not only eliminate a bothersome process from the system, it may provide relief in the process of auditing.

- When auditing is done by recording the alterations of fields, the burden of auditing is placed on each transaction. Auditing then becomes a

(Continued on In Depth/20)

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IN DEPTH

(Continued from In Depth/15)

major consideration of the development team. It would not be difficult to prove that auditing at the field level effectively doubles the cost of a system.

- When the integrity of historical records is ensured by the removal of change functions, each historical record becomes a member of the audit trail. The burden of auditing is placed on the auditors and, even then, is less because the records do

not have to be reconstructed.

As before, specifications calling for separate audit functions and historic changes should be reviewed and, if not legally required, reconsidered.

- Conversion can be facilitated by loading the existing data onto another file without change and moving the information over with Natural programs. If this is to be done, the capability should be developed early enough in the game to allow the new programs to cut their teeth on live

data and to avoid those nasty surprises that result from source data not being quite as advertised.

Early penetration into existing files also allows correction at the source level by the existing system, which might have the more appropriate means already in place to do so, rather than adding the chore of laundering data to the new system.

- Natural can be implemented so rapidly that too little consideration could be given to the machine, with

the result that the system will not perform.

In justifying systems, not only the cost of development, but also the effect on equipment must be balanced against the value of the information received. The result might make the proposed system less than cost-effective. It is better to discover this early.

Schedules could be affected by a wait for delivery and installation of new gear, and the "infant mortality" experience, when new parts fail, could considerably extend the effective delivery dates. Every factor should be considered — twice.

- Finally, simplicity in Natural projects relates to the developers' work only. Procedures that were complicated before will remain complicated. There is a point of over-simplification at which the cost of development incorporates requests beyond the original intent of the system and where very complex code will be generated for cosmetic purposes at a cost higher than anticipated.

The underlying theme in this discussion has been that control is achieved through realistic development efforts. The cost of a process should not exceed the benefits.

If, using one of the above examples, the client remains adamant about the need for a full-screen validation and wants to see all errors at once, some effort should be made to show that a certain percentage of the cost — say, 20% — will be consumed in developing a recursive mapping capability, which will be used less and less as the operators gain experience. The result will be several thousands of dollars, weeks of effort and daily expense spent on something that is not used at all. This should be carefully explained to the client.

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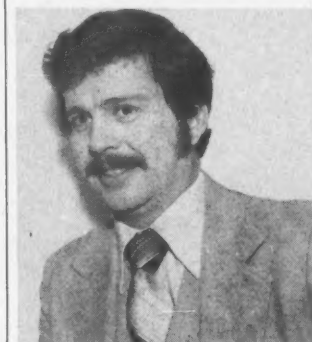
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About the Author

Dan Nolan has developed systems for insuring, banking, advertising, education, defense, manufacturing and federal, state and local governments. Currently, he is deputy director of business information systems at Computer Sciences Corp., Washington, D.C. He is the founder of Heuristic Development Co. and serves on the faculty of the USDA graduate school and is a past president of the Software AG Users Group.

Aug. 19 Seminar To Explore WP/DP Integration

SAN FRANCISCO — Office automation and the integration of word processing and data processing will be the focus of a seminar sponsored by Frost & Sullivan, Inc. here, Aug. 19-21.

The seminar will describe office automation concepts and capabilities, discuss how office automation is being used effectively today and identify the likely cost benefits in office automation and DP and WP, according to Frost & Sullivan.

Seminar leaders are Brian R. Blackmarr, a firm principal and director of the office automation group of Lifson, Hermann, Blackmarr & Harris of Dallas, and Thomas H. Elder, manager of information services, Frito-Lay, Inc., Dallas.

Registration fees are \$650 for the first attendee from one company and \$600 for the second attendee. Frost & Sullivan is located at 106 Fulton St., New York, N.Y. 10038.

Xerox 860 Gets 3270 Emulation

DALLAS — Xerox Corp. is offering users of the Xerox 860 an option for emulation of the IBM 3270 CRT terminal Binary Synchronous Communications.

With the 871 interactive communications emulator, a Xerox 860 reportedly will emulate the functions of an IBM 3277 display station and the 860 operator will have interactive access to the data base of remote host computers.

Up to seven 860 systems can be attached simultaneously to the 871 by dial-up, hard-wire or leased communications lines permitting any of the remote 860s access to a host computer from any telephone line.

Data also can be stored from the remote computer locally and information can be manipulated together with word processing files, according to a vendor spokesman.

The 871 emulator costs \$14,990 from Xerox Office Products Division, 1341 W. Mockingbird Lane, Dallas, Texas 75247.

Publications Focus On Productivity

WILLOW GROVE, Pa. — Two publications aimed at helping businesses become more productive are being offered by the Administrative Management Society (AMS).

"Meeting the Productivity Challenge" presents methods and techniques that reportedly can increase both clerical and managerial productivity. "Management and the Challenge of Automation" focuses on the new office technologies and the benefits, risks and issues surrounding them, according to an AMS spokesman.

Both publications feature information on how to prepare for the new technologies in terms of equipment and cost, as well as how to address the human resource problems, AMS said.

"Meeting the Productivity Challenge" is available for \$10 and "Management and the Challenge of Automation" is available for \$30 from AMS at 2360 Maryland Road, Willow Grove, Pa. 19090.

Office Meet Told Changes Needed for Human Factors

By Ann Dooley
CW Staff

CINCINNATI — If changes allowing for human factors are not implemented in the automated office now, it will take too much time and money to do it later — and by then it will be too late.

Those were some of the feelings expressed by a panel of experts at a recent office conference here entitled "Occupational Health Issues Affecting Clerical/Secretarial Personnel." Sponsored by the National Institute for Occupational Safety and Health, the conference explored the need to cope with the onset of office automation and its resulting changes while at the same time improving the quality of work life.

Extolling the wonders of the "Office of the Future" only instills fear in office workers that a major revolution is about to occur in their jobs, when instead the changes will be evolutionary in nature, according to Susie Van Huss, professor and program director of office administration, College of Business Administration at the University of South Carolina.

By 1985, the equipment investment will quadruple to \$8,000 per office worker and that means a lot of equipment is going to be introduced that will change the role of the office worker, she stated.

Although technology raises fears, especially among older employees who are more unschooled in automated procedures, technology is not the only force of change. The almost unquenchable demand for information is also creating changes. But the information glut is get-

ting out of control because of an emphasis on obtaining more and more information and sacrificing quality information for gross quantities of information, Van Huss asserted.

Another panel member, consultant Amy Wohl, told the audience that office automation is "more than CRTs in clerical and secretarial jobs."

"There is nothing malicious going on — what we have is a huge pile of ignorance," she added, as she defended managers against claims of sacrificing worker comfort for increased productivity.

The equipment being designed is not logical to office workers. As much as 99.9% of the machines do not meet the needs of ease of use for the office worker, Wohl, president of Advanced Office Concepts Corp., stated.

Wohl charged that now is the time to speak out about the inadequacies of terminals. "In one year, too much money will be spent on the wrong things. We will proceed with automation whether we know what we're doing or not." Large user companies cannot wait for answers, she asserted, adding that many companies believe their productivity needs require automation.

Transitory Concerns

Wohl viewed concerns over automating the office as transitory: "Twenty years from now, we won't be talking about whether people will willingly use computers," and by then they will be an everyday fact of life.

Wohl also brought up the subject of equity and whether, as productivity increases occur in an office, the increased profits should be distributed in part to the employees who effected the increases. She told the audience this will become a major issue in the future — particularly on the part of unions and employee groups.

The biggest challenge of the '80s will be to design equipment that is easy to use, according to Avriel Salvendy, professor at

(Continued on Page 56)

Office Terminal Introduced by HP



Hewlett-Packard's HP 2382A

PALO ALTO, Calif. — A 9-in., 22-lb office display terminal has been announced by Hewlett-Packard Co.

The HP 2382A reportedly provides large-screen 80-col by 24-line capabilities, display enhancements, eight screen-labeled softkeys and typewriter-style detached keyboard. Typical applications are data inquiry, data entry and program development.

The terminal costs \$1,700, HP said. Options include six language keyboards at a price of \$80 each and a line-drawing character set at \$80. Delivery is in six to eight weeks from 1501 Page Mill Road, Palo Alto, Calif. 94304.

Three Features Update Wang OIS

LOWELL, Mass. — Wang Laboratories, Inc. has enhanced its OIS series with a spelling verifier with an 80,000-word dictionary, an ergonomic proportional space workstation and a typewriter feature for direct printing.

The spelling verifier is an optional package for the OIS 140 and 145 and allows the user to add words to it or establish additional user-defined dictionaries, the vendor said.

The workstation, in conjunction with a proportional space print wheel, can produce documents and is available with telecommunications as well as with an optional built-in minidiskette drive that archives documents to 5¼-in. diskettes, the vendor claimed.

The typewriter feature enables the user to employ a standard 64K-byte workstation in regular typing applications that formerly required a separate typewriter, the company reported.

Available in September, the spelling verifier is priced at \$1,000, the workstation at \$5,500 and the typewriter feature at no charge from Wang Laboratories, Inc. One Industrial Ave., Lowell, Mass. 01851.

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System Accesses Data Base To Produce Letters, Forms

CULVER CITY, Calif. — Cybertek Computer Products, Inc. has developed a letter and document production system, Cyberscribe III, that retrieves master file data from a central computer data base for use in a variety of preformatted letters and reports.

The system was designed for life insurance home and branch offices and eliminates the need to rekey information from the master files into documents, the firm said. An outgrowth of Cyberscribe II, the system offers the features of that system, as well as the formatting features of word processing.

Insurance companies can use the system to recall and print letters and reports from a file of standard letters and reports tailored to the needs of each department, to recall portions of letters and reports, to assemble the

documents as needed and then print the assembled versions and to keep correspondence current by updating formats when needed.

The interface host software computer runs on any IBM-compatible computer system, IBM Model 360, 370, 30 series or 4300, with any version of OS, OS/VS, DOS or DOS/VS. Because Cyberscribe III is teleprocessing monitor-independent, it can be used with any system, including CICS and CICS/VS, the firm said. The software is written in Ansi Cobol and Assembler.

A typical price is \$127,500 and includes the firm's information management minicomputer, eight terminals, two character printers, Cyberscribe III and word processing package. The vendor can be reached at 6133 Bristol Parkway, Culver City, Calif. 90230.

Meet Told Changes Needed

(Continued from Page 55)

the School of Industrial Engineering, Purdue University. People are being forced into a situation of serving the equipment, he said, rather than the other way around.

Improving CRT terminals is not sufficient to improve the overall situation. Designers and implementors must examine all the factors in an office environment and study their interaction, not just look at each item in isolation, he noted. For example, an ergonomically sound CRT terminal will not benefit an employee if it is stuffed into an area where a typewriter was used before — more space for paper and other manual functions must be designed into the work space.

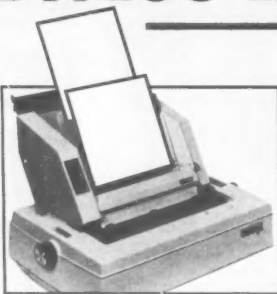
The Office of the Future means something different to everybody, Mary Ruprecht, president of Mary M. Ruprecht & Associates, Inc., reminded the gathering. In order to

improve the productivity in the office, it is first necessary to increase the number and skills of the potential employees coming from technical schools and universities. More training is going to be needed every time there is staff turnover or a change in office equipment.

Time spent handling papers or wasted in the telephone process are factors detracting significantly from improved productivity, she stated, adding the solution is to increase the capital investment per worker.



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Data 3500 Gains Spelling Check

SEATTLE — The ability to search for spelling errors is a major enhancement of Release 1.5 of The Office Manager, Inc.'s Data 3500 word processing system.

Another enhancement is the ability to sort a page of lines by any column of information on the page. For example, users can alphabetize up to 100 lines by city or Zip Code.

Also featured are an enhancement that reportedly allows the merging of two documents and another that is said to guarantee the current date will appear on documents every time they are printed.

Release 1.5 costs approximately \$2,000 from the firm through P.O. Box 66596, Seattle, Wash. 98166.

Astra Tool Melds DP, WP

LEXINGTON, Mass. — NEC Information Systems, Inc. has announced a word processing applications software package said to give end users a fully integrated, multitasking and multiuser DP and WP business system when combined with the company's Astra Series computers.

The Astra package allows both DP and WP to function simultaneously and share data files on the same system, the vendor said.

Available in September, the Astra package is priced at \$2,000 from NEC Information Systems, Inc., 5 Militia Drive, Lexington, Mass. 02173.

Visual 200 Gets 'Wako' For Multikey Commands

ISELIN, N.J. — Computer Mart of New Jersey is offering Wordstar Adapted Keyboard Option (Wako) for the Visual Technology, Inc. 200 terminal, consisting of a series of color-coded keys dedicated to the various functions of the Wordstar word processing program.

These keys reportedly increase operator efficiency by eliminating the need for commands that require the combination of several keys. Other dedicated functions include release margin, set right and left margin, clear tab, set tab and various others. Additionally, there is a cursor movement group of keys that move the cursor in various directions, the firm

said.

The Visual 200 terminal with Wordstar software and the Wako option sells for \$1,995. An upgrade for existing Visual 200 terminals is available for \$350 from the vendor at 501 Rt. 27, Iselin, N.J. 08830.

CompuTek Adds WP Package

BURLINGTON, Mass. — CompuTek, Inc. has announced a word processing package said to support up to eight terminals.

Features include editing functions, on-screen math features, a glossary and options file, file management features, printer formatting and typesetting, the vendor said.

The package costs \$200, the vendor said from 63 Second Ave., Burlington, Mass. 01803.

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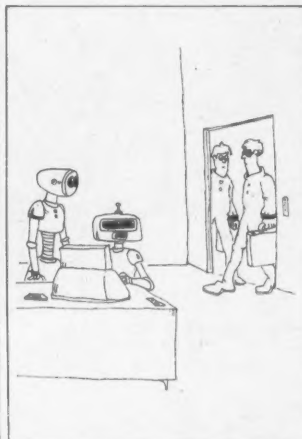
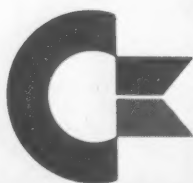
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Business Tools Run On Lexitron Systems

STERLING, Va. — Berman Associates is offering five business software packages for use on Lexitron Corp. VT word processors.

Four of the five are accounting packages: general ledger, accounts payable, accounts

receivable and payroll, the firm said.

A list management package, suitable for mailing list, association rosters and other recordkeeping applications is also available, according to the firm.

The packages are \$2,000 each, Berman said from Suite 14, 101 E. Holly Ave., Sterling, Va. 22170.

Typesetter Tied to TV

DOWNEY, Calif. — Type Share Co. has announced a computerized typesetting input system that can be used for low-volume users such as churches, clubs and part-time writers.

Based on the Commodore Business Machines, Inc. VIC-20 microprocessor, the system provides video display via connection to any television.

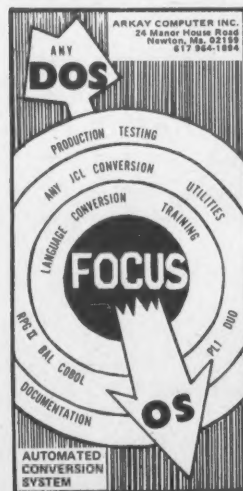
Monitor functions include input, review and editing copy with four system commands.

The copy, complete with typesetting codes, is recorded on cassette tape, which can be input into a larger Type Share system for further editing, the vendor said.

Systems start at \$500, the vendor said from 8315 Firestone Blvd., Downey, Calif. 90241.



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'Subscript' Handles WP on IBM Series/1

RANCHO PALOS VERDES, Calif. — Academic Software Research Associates has introduced the Subscript word processing system for the IBM Series/1. The software is intended for such uses as preparing memos, letters, mass mailings, documentation, book-length manuscripts, footnotes and multiple-column output.

Subscript includes more than 70 commands, including macro definition with parameters so that users can develop their own libraries of WP commands, the vendor said. Utilities are available for displaying and spooling processed documents,

management of mass mailing address and prospect files and, for Series/1 installations linked to hosts, the interchange of Script and Subscript files.

Written in EDL for Release 3 of the EDX operating system, it requires approximately 20K bytes and is upwardly compatible with Script systems on mainframes.

Prices range from \$900 for the basic word processor and file spooler to \$1,650 for the entire system. The word processor with mass mailing utilities is \$1,400. The firm can be reached at 7010 Hartcrest Drive, Rancho Palos Verdes, Calif. 90274.

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As Profit Margins Evaporate Terminal Distributors Eye New Markets

By Marcia Blumenthal
CW Staff

No longer willing to tolerate evaporating profit margins, some distributors of terminal products are turning to new markets.

Distributors interviewed recently by *Computerworld* placed the blame for those evaporating profit margins on an oversupply of manufacturing capacity and the entry into the market of giant electronics distributors.

"There has been a general 'Alice in Wonderland' attitude that the terminal industry will always be bigger and better tomorrow," observed Jim Loonam, president of Loonam Computer Terminals, Inc. However, that has changed now.

Manufacturing Overcapacity

Manufacturer overcapacity has been one of the reasons for squeezed profit margins during the past 18 months, especially in the commodity-type terminal market, charged Howard B. Crystal, group vice-president of marketing at Data Access Systems, Inc. (Dasi). He pointed to the Digital Equipment Corp. VT100 terminal, once on allocation, but now in ready supply because of an increase in production capacity by the mini maker.

"Profit margins have gone down drastically, primarily because of the availability of product," agreed Charles Yonker, vice-president and general manager of the Systems Division of Carterphone Communications Corp. Major terminal manufacturers such as DEC, Teletype Corp. and Texas Instruments, Inc. have increased their manufacturing capacity significantly throughout the past couple of years.

Unlike car dealerships, the terminal distribution business does not have exclusive geographic distribution, so prices

often tend to fluctuate, Yonker said.

And terminal manufacturers have been signing on giant electronics distributors such as Hamilton Avnet and Kierulff Electronics, Inc., which compounds the problem for individual distributors. "When they do that, they are not just adding one distribution company, but 20 to 40 branches in one clip. The number of terminal distribution sales offices has probably multiplied by a factor of four in the past 36 months," Loonam maintained.

"We have met the enemy and he is us," concluded Loonam, who has agreed in principle to have his firm acquired by Avnet Corp., the parent firm of Hamilton Avnet.

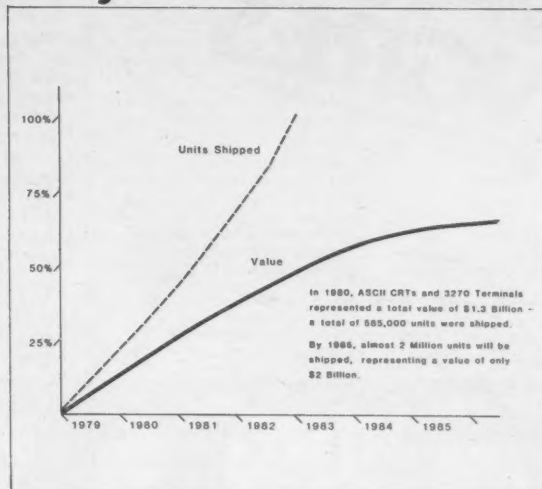
Pumping Iron

Overcapacity has also put a lot of pressure on manufacturers to pump iron out the door. Dasi's Crystal said top executives at commodity-type terminal manufacturing companies are visiting dealers with unprecedented frequency to find out why their products are not moving.

Although many segments of the terminal market are growing at 35% annually, the mystique with terminals is over, as many powerful terminals are now selling for less than \$1,500 each.

As a result of the current terminal market environment, some terminal distributors have expanded in new directions. Crystal's company is now putting emphasis on distribution of more innovative products that carry higher profit margins — such as some of Burroughs Corp.'s terminals and other products, including intelligent controllers, other front-end processing systems and micro-processor-based network systems.

(Continued on Page 62)



Shipments, Value of Ascii CRT and 3270 Terminals (1979-1985)

Study Sees Growing Market, Lower Prices for CRT Terminals

CAMBRIDGE, Mass. — Although shipments in the two fastest growing segments of the terminal market — Ascii CRT terminals and the IBM 3270s — will grow annually at an average rate of 25%, the installed value of those terminals will increase by only 10% per year because of declining prices for those products, according to a recent study by The Yankee Group.

This year will be a turnaround year for Ascii CRT editing terminals, The Yankee Group noted. By year-end, some 390,000 Ascii terminals will be shipped, of which 266,000 or 68.2% will be editing terminals, compared with 1980 shipments, which were only 47% editing terminals, the report estimated.

However, while healthy, the market is deceptive because the

future is not attractive for all vendors. The profit squeeze in this market portends a shakeout within the next few years, and vendors that do not have high-volume capability will be forced to find specialized niches, the report noted.

The traditional top three vendors, Applied Digital Data Systems, Inc.; Lear Siegler, Inc.; and Hazeltine Corp., will find competition from new vendors that are able to satisfy minimum requirements of the market. Televideo, Inc., Zenith Data Systems Corp. and Ampex Corp. are likely to become leaders in the Ascii terminal market, The Yankee Group forecast.

Within the 3270 arena, last year IBM held about a 58% share of the total 300,000 units shipped, the report noted. The total installed base for this type of terminal is estimated at about 1 million, with IBM controlling about 55%. Shipments should continue at a steady 25% to 30% annual growth for the next couple of years.

However, independent manufacturers such as Harris Corp., Telex Corp. and Memorex Corp. will continue to face margin pressure from IBM's control on the pricing of these units and will have to add Synchronous Data Link Control capability. Other margin pressures will come from service and marketing requirements, the report said.

The "Data Terminal Research" report is part of The Yankee Group's monthly series provided under its Communication/Information System Planning Program.

The company can be contacted through P.O. Box 43, Harvard Square, Cambridge, Mass. 02138.

Quarter Loss Hits \$24 Million

Memorex Moves to Divest BSD

SANTA CLARA, Calif. — Continued financial losses have caused Memorex Corp. to begin proceedings to divest its Business Systems Division (BSD) and phase out portions of its low-density OEM disk drive program.

For its latest quarter, Memorex reported a net loss of \$24.3 million or \$3.35 per share, which included some \$15 million in charges and reserves — not involving cash — associated with the firm's continued restructuring. During the same quarter of 1981, the company reported a loss of \$21.7 million or \$3.11 per share.

Revenues for the second quarter were \$201.9 million, up from \$185.7 million for the

comparable period last year. With nearly one-half of the firm's revenues coming from international sales, profits were heavily reduced by the strengthening of the U.S. dollar against major international currencies, but would have been at about the break-even point if the dollar had stayed at the same level, the firm claimed.

Memorex has signed a letter of intent to sell BSD to Applied Technology Ventures of Anaheim, Calif. Terms of the agreement were not made public. BSD produces a variety of IBM plug-compatible peripherals used with IBM's System 3 products. This largely end-user-oriented unit, acquired in 1977 from Business Systems Tech-

nology, was folded into the storage systems and communications operations last year [CW, Dec. 8]. The firm said the prospective buyer would continue servicing the current user base.

The firm has established a \$2 million reserve in connection with the anticipated sale of BSD.

In addition to the proposed sale of BSD, Memorex will shift emphasis away from its low-capacity eight-inch OEM disk drive program and concentrate on higher density versions of those and other disk products. Moreover, the company will phase out its Models 612 and 601 14-inch disk drives. The

(Continued on Page 62)

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Memorex Moves to Divest BSD

(Continued from Page 61)

firm said it would honor all current commitments for these products.

C.W. Spangle, the firm's chairman and chief executive officer, said the decision to shift emphasis in the 8-in. disk program came after three years of costly investment that resulted in "disappointingly slow" acceptance by systems integrators and other manufacturers. The firm will continue to emphasize its OEM disk business, but the emphasis will be on higher density units.

Memorex made a charge of \$10 million against current profits for its decision to reorient the disk program.

Loan Negotiations

As a result of losses and write-offs during the past year, Memorex does not meet certain financial statement

tests agreed upon with its principal lenders.

However, no default has been declared under any of these agreements and the firm is negotiating with lenders for new long-term and current financing agreements on a secured basis. Until certain financial tests can be met, the firm is prohibited from paying dividends on its preferred stock.

For the year to date, Memorex' revenues totaled \$393 million, up from \$371 million for the first six months of 1980. The total loss for the current fiscal year climbed to \$31.5 million or \$4.49 per share, compared with 1980's six-month loss of \$20.6 million or \$3.06 per share.

Distributors Eye New Markets

(Continued from Page 61)

Fortunately, distributors are in a position to change direction relatively quickly, he noted. "We are not buying as much for our usual suppliers and have cut back on inventory."

Last April, Carterphone set up a new Systems Division to sell more systems-oriented products with a higher degree of software content, Yonker noted.

Although the systems house business is also highly competitive, Yonker said, the systems business "has more control over its destiny because of the variety in product selection and marketing techniques."

Carterphone is selling a line of network preparation equipment — terminals with software for message preparation to operate over private data communications networks. Moreover, the company is expanding its service operation to provide nationwide maintenance both for the equipment it sells and for that of other vendors.

Working as Partners

In general, both Crystal and Yonker think terminal manufacturers would be better off if they worked as partners with terminal distributors rather than treating them strictly like OEM buyers. More flexible contractual terms are necessary, Yonker noted.

Crystal suggested some manufacturers limit the number of distributors and get rid of parts of their end-user sales force that compete with independent distributors.

Joint advertising is another way manufacturers could improve relations with distributors. Both DEC and Lear Siegler, Inc. now have co-operative advertising programs.

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New ICL Head Sets Strategy To Combat Financial Woes

By Graham Bunting
Special to CW

LONDON — Just nine weeks after taking over as managing director of ICL Ltd., Robert W. Wilmot has decided on his strategy for the regeneration of the financially beleaguered company.

The strategy includes the introduction of risk management to improve the return on expenditures for product development, some pruning of hardware and software products, a redeployment of development spending and the establishment of a new relationship with the software industry.

These objectives are additions to those already announced, namely, the cutting of manufacturing costs and the search for partners for collaborative ventures.

At the Heart

At the heart of Wilmot's new direction for ICL is the greater use of the entrepreneurial talents latent within the company.

"We have a lot of bright people who have not gone off to set up venture capital organizations," Wilmot asserted, contrasting this phenomenon with the situation in the U.S., where large manufacturers lose talent in this way on a grand scale.

Wilmot has already worked personally with a number of hardware development teams within the firm "to set the tone" for this corporate position.

Shortening product development times and increasing product life cycles with better price/performance ratios may sound pretty obvious, but the term "risk management" will have a very unfamiliar ring to the bureaucrats of ICL, more familiar with the dialects of the civil service than with those of modern management science, according to the ICL director.

In summing up his strategy, Wilmot said, "We need to move as quickly as the Wangs and Primes and

bring in ICL's marketing clout behind this."

One major element in the product streamlining plans has already come to light — the decision to drop VME K and concentrate on the VME B operating system family.

Six months from now, the ICL director said, there will be fewer processors in the 2900 group, although it will span the same performance range. Customer requirements for small increments in power will be met by field enhancements, Wilmot noted.

Bunting is editor of Computerworld UK.

Amdahl Reports Threefold Gain In Second Quarter Earnings

SUNNYVALE, Calif. — Amdahl Corp. reported a more-than-three-fold gain in its second quarter earnings compared with the corresponding 1980 quarter.

Amdahl's earnings in the 1981 second quarter totaled \$7.3 million or 35 cents per share, up from the \$2 million or 12 cents per share reported in the same period last year. For its first six months, the firm reported earnings of \$13 million or 63 cents per share, up from \$2.8 million or 16 cents per share in the first half of 1980.

"Profit gains in this quarter resulted primarily from a greater number of system installations,

higher product margins, greater software and customer service and support revenues and interest income as compared to interest expense in the year-ago period," noted John C. Lewis, Amdahl's president.

Revenues rose about 10% from \$98 million in 1980's second quarter to \$107.9 million in the current quarter. For the first six months, total revenues reached \$203.4 million — up from \$186.6 million for the first six months of 1980.

Lewis also said the company was experiencing strong user interest in its 470 systems and high-performance 580 systems.

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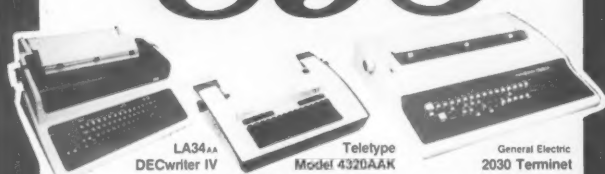
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OTA Sides With Industry, Urges Congress to Develop Unified High-Tech Policy

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. — The semiconductor and computer industries, which have been urging Congress to develop a unified set of policies toward high-technology sectors of the economy, got a welcome boost recently from Congress' own research staff.

The Office of Technology Assessment (OTA) last month told two Senate committees that "helping to improve the competitiveness of American industry — both the ability to export and the ability to compete with imports in U.S. markets — is a feasible objective for Congress."

OTA's comments were part of a lengthy report on the industrial competitiveness of the U.S. electronics, steel and automobile industries. The report said "public perceptions that U.S. competitiveness has been slipping in manufacturing industries such as steel, electronics and automobiles are basically correct."

The research agency added its study "suggests that Congress consider developing a more coherent and explicit policy toward industry."

Then, echoing the words of semiconductor and computer industry lobbyists over the last few years, OTA said, "The health of these sectors will depend on their ability to generate and attract capital, on an adequate supply of well-trained engineers and scientists, on success at R&D and innovation and on trade policies that protect American firms from unfair competition at home while seeking fully reciprocal access to foreign markets."

Industrial Policy

The OTA project explored the desirability and feasibility of developing a "consciously formulated industrial policy," drawing together policies on government regulation, international trade, taxation and other areas in which public policy interacts with private commerce.

"Public policies in the U.S. seldom address economic efficiency and competitiveness directly," OTA said, adding: "Nevertheless, the government plays an important role in determining the conditions and environment for the conduct of business."

Although "public policies often shape corporate strategies in oblique and direct ways," the study noted, "only in rare cases do the impacts of government policies on competitiveness seem clear and unambiguous."

The work results from the increasing congressional awareness of that ambiguity throughout the last decade in the face of decreasing U.S. industrial competitiveness. Over the last several years, Congress has accelerated its attempt to define the government's proper role in tackling trade deficit and declining productivity growth rate problems.

OTA explained it explored the steel, electronics and automobile industries because "together, these three sectors include much of the na-

tion's industrial base, providing employment for a substantial fraction of the work force."

Turning specifically to electronics, OTA said "it is probably not an exaggeration to say that the semiconductor industry — and particularly the applications of semiconductor technology — are now the ingredients most vital for the future of an advanced industrial economy."

Looking ahead, the study predicted that "on an overall basis . . . the U.S. should remain the strongest force in the world market for semiconductors and computers. At the same time, the relative strength of the U.S. will probably decline."

Key Ingredients

According to OTA, the three key ingredients for a competitive electronics industry are sufficient capital, adequate personnel and access "on fair terms" to foreign markets.

"Not all manufacturers will fare equally well in meeting these needs," the report noted. "Profits in the semiconductor industry have sometimes failed to keep pace with capital needs for expansion," it said, suggesting the semiconductor industry may have to invest more than \$30 billion in the 1980s to maintain its current market position.

"Virtually all U.S. electronics firms could benefit from public policies encouraging increased R&D and investment in new production facilities," the study continued, discussing various remedies, such as tax credits for R&D and federal support for joint industry, government and university research projects.

But, OTA said, "tax policies in the U.S. are not a particularly strong stimulus for innovation."

Given the importance of R&D in electronics, OTA said "there is ample scope in the U.S. for new policies to stimulate developments in both product and process technologies, and in particular to encourage the commercialization of R&D."

After addressing suggested methods for encouraging capital investment and increasing both numbers and quality of technical personnel, the study said the government might also act to promote free trade and investment. OTA noted moves to open Japanese markets, but said "improvements could still be made. Particularly important for the future is the ability of U.S. firms to compete on even terms within Japan through direct investments as well as exports."

"If American firms are allowed to compete on an equal footing with their foreign competitors in all markets, their proven ability to innovate and to develop new products should enable them to maintain a strong presence in semiconductors, computers and other high-technology branches of electronics."

"On the other hand," OTA warned, "a movement toward protectionism by the U.S. — in any industry — could impede the further opening of international markets and harm competitive American firms."

One of Top Growth Sectors of Economy

U.S. Electronic Market Reported Growing 24%

WASHINGTON, D.C. — Burnishing its image as one of the top growth sectors of the U.S. economy, the domestic market for computers and related equipment grew 24% last year, for a total 1980 sales volume of \$24 billion, according to the Electronic Industries Association (EIA).

The EIA 1981 *Electronic Market Data Book* noted, however, that those fig-

ures are based on government statistics. The association's annual compendium of statistics, charts, tables and graphs also noted that other estimates put 1980 computer equipment sales as high as \$30.7 billion last year, heading for \$59.3 billion by 1984.

Surveying the 1980 sales year, the book said "rising interest rates, increasing energy costs, continued inflation and weakening economies in Europe resulted in fewer orders for computer equipment in 1980 than in 1979, but large backlogs kept production and equipment levels stable."

Second-half 1981 sales could contribute stronger growth "as the new administration's pro-business poli-

cies begin to take effect," the EIA said, but the effect of dramatic interest rate hikes is unknown.

Capital Shortage

"Shortage of capital might influence end users to defer purchases of computer equipment, opting to lease instead. Some analysts, however, foresee the reverse trend: High interest rates could spark new orders from customers who look at computerization as a way to increase efficiency and productivity and to reduce administrative costs."

"As prices for systems and peripherals decline," the book suggested, "computer equipment may be

kept on corporate budgets while other items are slashed."

Based on its own research and supported by government statistics and private analyses, the EIA publication touched on all segments of the electronics industry.

• "The major portion of 1981 revenues for full-line computer manufacturers will come from sales of large mainframe computers and distributed systems, which are expected to total \$17.3 billion. Because the market is relatively mature, industry analysts foresee a growth rate of only 5% in 1981, the slowest in the industry. Sales of plug-compatible main-

(Continued on Page 68)

EIA Report Summarized

WASHINGTON, D.C. — For those in a hurry — or who just love figures — the Electronic Industries Association has condensed its 115-page 1981 *Electronic Market Data Book* into the following summary:

"U.S. factory sales of electronic equipment, systems and components totaled \$104.3 billion in 1980, representing an increase of 18.5% over last year's total of \$88 billion.

"Over one-third of this sales volume was in the industrial electronic equipment and systems category, where total sales came to \$38.8 billion, marking a 19.9% increase over 1979 sales of \$32.4 billion. Another 28.3% of total electronics shipments consisted of communications equipment and sales. Sales in this category came to an estimated \$29.5 billion, about 15% over 1979 sales.

"Factory sales of electronic components totaled \$25.4 billion in 1980, an increase of 22.9% over 1979 sales, which were \$20.6 billion. Components represented 23.3% of the total electronics sales volume.

"The consumer electronics category saw a 13.4% increase in sales volume at the factory level, with 1980 sales totaling \$10.6 billion compared to 1979 sales of \$9.4 billion. Consumer electronics comprised 10.2% of the total electronics sales volume in 1980.

"An estimated 1,570,000 persons were employed in electronics manufacturing and related activities in 1980. Compared to an estimated total of 1,463,900 for 1979, employment saw a 7.2% increase.

"U.S. exports of electronic products came to \$20.1 billion in 1980, and imports totaled \$13.3 billion, resulting in a balance of trade surplus of \$6.8 billion."

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Supershorts

Innovative Computer Products has altered its sales focus from exclusive OEM sales to the establishment of a distributor and sales representative network to complement its OEMs.

Digital Equipment Corp. has announced a Decdealer program through which independent dealers can purchase the Decmate word processor systems, peripherals, word processing and Dibs accounting software, list processing and sort utilities for resale to end users. The program will become effective in September.

William C. Norris, chairman and chief executive officer of Control Data Corp., has been named top business speaker of 1981 by the Interna-

tional Platform Association and will receive the *Forbes* magazine award.

The Proprietary Systems Division of SMC Systems and Technology, Inc. will host its Fourth Annual Idol (Interactive Definition-Oriented Language) Dealers' Conference Sept. 29-Oct. 2 in Orlando, Fla. Conference highlights will include compatible hardware products offered by manufacturers.

Sperry Univac has formed a Southern Asia headquarters in the Republic of Singapore responsible for its computer marketing and service operations in Singapore, Malaysia, the Philippines, Indonesia, Thailand and India.

Zendex Corp. has announced the formation of Quota, a division that will market medium-size business systems based on the company's line of Multibus boards. Douglass L. Campbell, Zendex marketing manager, has been named general manager of the division, which is located at 6680 Sierra Lane, Dublin, Calif. 94566.

Leasametric, Inc. will resell new terminals and other data processing equipment.

Harris Corp.'s Data Communications Division has opened seven customer education centers to train and support users of the firm's distributed data processing systems.

Alanthus Corp. has changed its name to Technology Finance Group, Inc. as part of the divestiture of its Alanthus Data Communications Corp. subsidiary. The former subsidiary will retain the Alanthus name.

Priam Corp. has shipped the 2,000th Winchester disk drive manufactured at its San Jose, Calif., plant to BTI Computer Systems, Inc. in Sunnyvale, Calif. BTI has contracted with Priam for Winchester products valued at more than \$3 million.

National Semiconductor Corp. has increased its standard warranty period on DEC-compatible add-in memories to two years.

I/O

Printers, plotters, point-of-sale, COM and much more—in **Computerworld's** August 31st Special Report.

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U.S. Market Growing 24%

(Continued from Page 67)

frames, however, are projected to increase 16%."

- "Sales of small business computers increased only 14.6% to an estimated \$3 billion in 1980, compared to a 21% growth rate in 1979. Industry analysts foresee a 20% increase to \$3.6 billion for 1981, with sales exceeding \$9 billion in 1984."

- "Some computer firms anticipate that software revenues, including software packages and support services, will equal revenues from hardware sales by 1990. Sales of applications software, which constituted 50% of the 1979 software market, are expected to total \$1.8 billion by 1984 and utility software sales could exceed \$1.1 billion."

- "While growth in distributed data processing and use of small computers have fueled the demand for peripherals, spiraling inflation has caused market analysts to anticipate a 15% to 25% growth rate in 1981 peripheral sales, down from 25% to 35% growth rate experienced in 1980 (up from \$9.6 billion to \$11.9 billion)."

1980 sales of direct-access auxiliary storage peripherals reached \$4.8 billion, up from \$3.9 billion in 1979. Serial access devices topped \$935 million, compared to \$755 million the previous year.

In the rapidly changing data entry market, the terminal segment "could be affected by high interest rates," the EIA said, "prompting customers to lease rather than purchase equipment. Some sources believe the 25% to 30% growth rate for terminal sales in 1980 will decrease to 15% to 20% in 1981." CRT and multifunction terminal sales totaled \$2.59 billion last year, compared to 1979's figure of \$2.09 billion.

The EIA publication also said more than 1.5 billion Americans were employed in electronics manufacturing in 1980, and employment in U.S. electronics industries grew by an estimated 7% last year.

The EIA's 1981 *Electronic Market Data Book*, with more than 100 pages of information, charts and graphs on electronics, communications, world trade, employment and research and development, is available for \$50 (\$25 for EIA members) from Marketing Services Department, 2001 I St. N.W., Washington, D.C. 20006.

NBS Seeking Volunteers' Aid For Research

WASHINGTON, D.C. — The National Bureau of Standards (NBS) is seeking private organizations, particularly in the electronics and automation fields, to take part in the agency's industry-oriented Research Associates Program.

NBS said it wants to significantly expand the program, which currently enables 100 scientists and engineers from private companies and trade and professional associations to conduct cooperative research at NBS on projects of mutual interest.

The agency noted research associates can benefit from the use of its facilities and from the opportunity to consult with the NBS professional staff.

More information is available from Peter de Bruyn, Industrial Liaison Officer, National Bureau of Standards, Washington, D.C. 20234.

Manual Gives Specs, Prices on Rigid Disks

CUPERTINO, Calif. — Dataquest, Inc., a subsidiary of A.C. Nielsen Co., has recently completed a reference manual entitled "Rigid Disk Drives — 1981 Specifications and Prices." The manual consists of 250 pages of information on rigid disk drives designed to be used by manufacturers, salespeople, distributors, resellers and other major users, according to the firm.

Organized into seven major categories, the manual contains technical specifications and pricing information for 265 rigid disk models by 43 manufacturers worldwide, according to Dataquest.

The manual costs \$2.95.

More information on the manual is available from Christine Steitz at Dataquest, Inc., 19055 Pruneridge Ave., Cupertino, Calif. 95014.

Executive Corner

- Thomas A. Tomasetti has been chosen vice-president and general manager of the Products Division at Calma Co.

- Ted L. Priem has been named senior vice-president and general manager of the product business group at Comserv Corp., and James Borgstrom has been named vice-president and general manager of the processing services group.

- John A. Stockford has been appointed vice-president of marketing at GTE Lenkurt, Inc.

- Memorex Corp. has appointed David B. McGlaughlin to the new position of vice-president of U.S. equipment sales and service.

- Ira M. Lubert has joined Business Communications Systems, Inc. as

vice-president of U.S. sales.

- System Development Corp. has named John B. Munson corporate vice-president of technical operations.

- Frederick P. Cochrane has been named vice-president of international manufacturing, and David L. Chapman has been named vice-president of U.S. manufacturing operations at Data General Corp.

- Wil Houde and John Vennard have been named vice-presidents of the Personal Systems Division at Apple Computer, Inc. Thomas J. Lawrence, headquartered in London, has also been elected a corporate vice-president.

- William J. Lifka has been appointed president of ITT Courier Systems,

a division of International Telephone and Telegraph Corp.

- Uninet, Inc. has appointed C. W. Keller vice-president of marketing and has promoted L. H. Nebel to vice-president of sales.

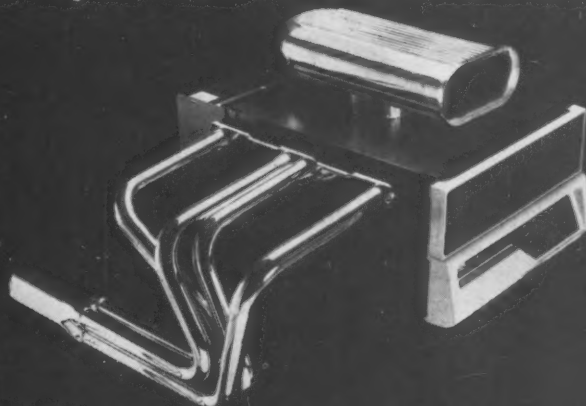
- Thomas A. Rota has been named vice-president of finance and administration at Masstor Systems Corp.

- Verne D. Dykema has been promoted to vice-president of southern operations in the Americas Division of Sperry Univac, a division of the Sperry Corp.

- Barry Dickman has been named to the newly created position of vice-president at Proximity Devices Corp.

- James I. Baker has been appointed vice-president and chief financial officer at Genisco Technology Corp.

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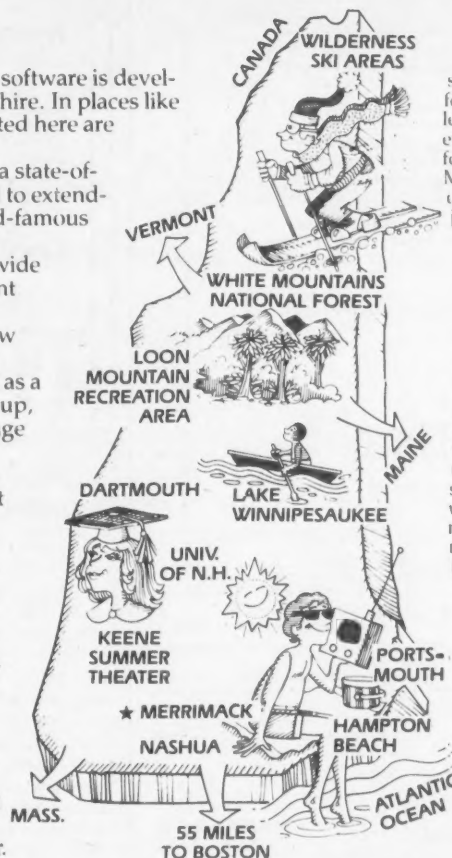
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Applications-oriented people to work directly with scientists developing computer codes to simulate a wide variety of complex physical phenomena. Applicants need a B.S. or M.S. degree in physical science, mathematics, or computer science, some experience in FORTRAN programming, and a strong interest in scientific applications.

Systems Programmers

Systems-oriented computer scientists to do micro, mini, and large scale computer operating systems design and development, including development of compilers, utility routines, graphics packages, data base management systems, and process control and data acquisition systems. Applicants need a B.S. or M.S. degree in computer science, plus a background in several areas of computer science.

Interested and qualified applicants should forward a resume with salary history and requirements to: Sue Porter, Employment Division, Lawrence Livermore National Laboratory, P.O. Box 808, L-425, Dept. KCW-081, Livermore, CA 94550.

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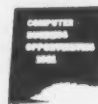
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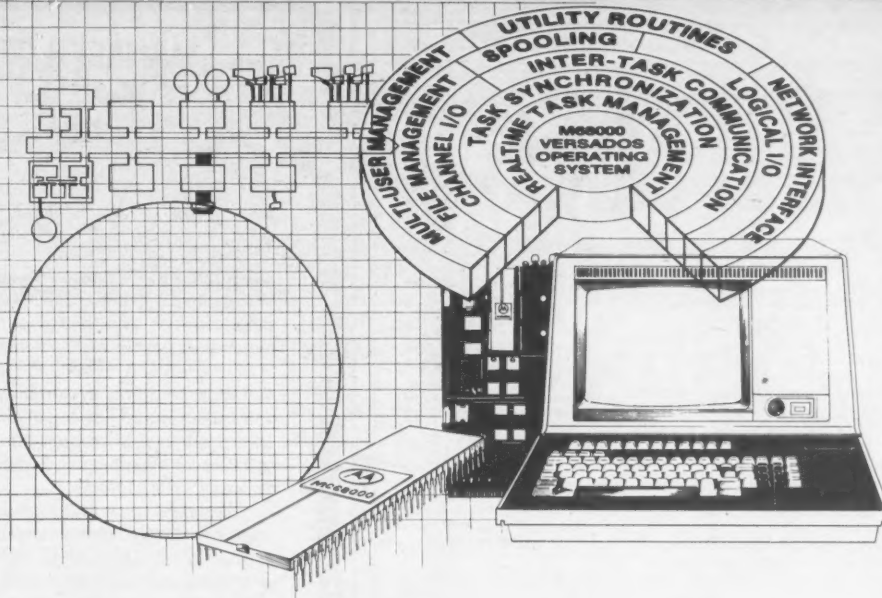
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Candidates with a BSEE or Computer Science degree and courses in Marketing are preferred. Three to seven years directly related experience with one year experience in computer or microcomputer-related fields desired.

PRODUCT PLANNING ENGINEERS

Responsible for Product Planning of hardware and/or software products including functional specifications, competitive analysis, business plans, and introduction plans. Duties also include customer and field sales contacts to present new product programs including features, attributes and benefits of the product.

This position requires a BSEE degree with courses in Marketing/Computer Science (MBA a plus) or equivalent work experience. Three to five years directly related experience required with two years experience in computer or microcomputer-related fields desired.

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Complete responsibility of our microsystems software lab to include the scheduling, installation, and maintenance of software development equipment.

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Design and develop operating systems software or firmware. Opportunities exist in areas of operating systems, run time libraries, device drivers, utilities, data communications (SDLC, HDLC), distributed processing, data base software, multiprocessing, simulators, compiler development tools and software qualification. Opportunities also exist in the areas of file management systems, network architecture, and real-time executives in a multiprocessor system.

Duties include software specification, design, programming, documentation and maintenance. Systems programming experience with minicomputers or mainframe computers in any of the above areas is desirable.

This position requires a BS degree in Computer Science or equivalent, plus two to four years experience.

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Responsible for managing a team of hardware and software engineers engaged in the development of intelligent mass storage peripheral for M68000 computer systems. Projects to include mass storage systems, disk systems, magnetic tape, and bubble memories.

This position requires a BSEE degree or equivalent, and five to seven years experience with two years in a similar position a plus.

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Responsible for managing the development of industrial plant control systems based on our M68000 microcomputer. Working knowledge of instrumentation, process control sensors, A to D converters, pressure and thermocouple 4 to 20ma devices, and RFI/EMI noise rejection systems.

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Responsible for design of microcomputers for development support systems. Will be a member of systems design team for 8-bit and 16-bit microcomputers. Will be responsible for translating marketing requirements into final products that incorporate microprocessor components, memories and random logic. Must also have a working knowledge of either systems architecture and communications or in-circuit emulation.

This position requires three to five years logic design experience with M68000 and M6809 microprocessor knowledge a plus.

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Responsible for design of microcomputers based on our M68000. Candidates should have experience with CACHE, virtual memory systems, and memory management architectures.

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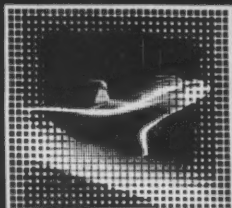
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Software systems engineers are needed to work with advanced spacecraft computer systems. The software performs all vehicle guidance and pointing control, command decoding and telemetry, and the control of payloads, solar array and antennas. Responsibilities include requirements analysis and definition, design, code and test routines using computer and vehicle simulation plus real flight hardware.

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Command, Control & Communications

Software engineers and data systems professionals are needed for the development of advanced C³ systems.

Systems to be developed include the applications of multiple-source information to tactical command and control systems. These applications require the use of Bayesian and other inferential probability techniques for correlation of multiple-source data and estimation of present and future tactical states. The development and employment of simulation programs to investigate the effectiveness and utility of postulated defensive weapons systems in varying tactical environments is required.

The development of man-machine syntax and symbology procedures to apply state-of-the-art graphics technology to tactical situations requiring fast, accurate human actions is also a requirement.

These systems require the synthesis of large scale data processing architectures to accomplish reduction and exploration of wide band data, and to accomplish the fusion and correlation of multiple source information.

Software engineers and programmers are needed to develop state-of-the-art Command Support Programs on ANIUYK-19 computers. Software development activities involves experience with Macro 11 Assembly language and/or FORTRAN simulation, fault isolation and realtime interactive graphic systems. Foreign travel opportunities are available.

System Software Development

The new programs, computer center, and on-going programs require individuals with experience with any of the following operating systems: VAX/VMS, RSX11M, CDC's MPX/OS, MVS/SP, Data General's RDOs or the Perkin-Elmer MT32.

Responsibilities include:

- Designing project specific enhancements to the operating system including special device drivers — e.g., an array processor driver; enhanced or new system services; HOL and macro interfaces to the enhanced system services; planning upgrades of operating systems to include: additional standard devices such as printer/plotters; new devices and corresponding drivers; vendor updates to the operating system.
- Consulting with application designers on critical issues, including: design and performance of system services; performance of standard devices; pending system changes.
- Qualifications include knowledge of OS internals and device driver experience. Members of this group specialize in one manufacturer's operating system but cross training on the other systems is typical. There is a strong emphasis on computer networking graphics subsystems and array processors.
- A continuing understanding of new and emerging technologies in both hardware and software is important since this group makes recommendations for new systems and for upgrades to current systems.

Software Designers & Programmers

Software designers and programmers are needed for a wide range of applications, including:

- Operating system programmers to make enhancements on CDC's MPX/OS Operating System and to generate software development tools.
- Interactive graphics display applications on intelligent terminals having keyboard, light pen and function keys.
- Real-time applications in navigation, command and control and telemetry data processing.
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- Simulation software development.
- Development of subsystem and system test data analysis software.

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Projects emphasize the synthesis of signal processing algorithms, estimation of performance and the development of software simulations for proof of algorithm concepts.

Opportunities are also available for applications software engineers utilizing VAX equipment with VAX FORTRAN, VAX/VMS, Program Design Language and Programmers Work Bench. Familiarity with computer networking, telecommunications, protocols, and foreign device drivers development will be helpful.

Other opportunities include the application of Fast Fourier Transforms, digital filters and equalization networks in microcode on a b² slice microprocessor.

Software & Software Test

The new programs are distributed processing systems that will be tested and integrated using techniques that enhance productivity including:

- Progressive Functional Integration which reduces the number of simulated interfaces.
- Sophisticated data source/sink simulators to allow parallel developments and regression testing (includes "virtual operators")
- Automatic Test result comparators which quickly isolate test anomalies.
- Error Seeding in an isolated configuration to "test" the effectiveness of the test program.

Test Planners

Responsible for:

- Designing the distributed processing tests to take maximum advantage of the techniques described.
- Coordinating with the government customer on test program status.
- Coordinating with software developers in defining and scheduling incremental software deliveries for test.

Experience with software test and system test is required — experience in distributed processing preferred.

Test Tool Developers

Responsible for:

- Communication simulators including PCL11, RS232 and IEEE interfaces.
- Data source/sink simulators for specific applications.
- Automatic result comparators.
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- Automatic requirements tracing tools.
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Experience in the appropriate area is desired.

Test Analysis Engineers

Responsible for verifying the systems performance against specification in areas such as:

- throughput
- algorithm performance against mission requirements
- man-machine interfaces

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In this entry level position, you'll be responsible for the design and development of state-of-the-art software for 2nd Generation, high speed, local area networks. You should have a BS/MS in Computer Science or the equivalent plus an interest in data communications. Familiarity with UNIX and C Language is a plus.

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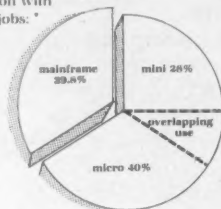
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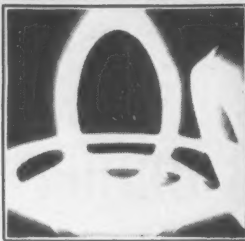
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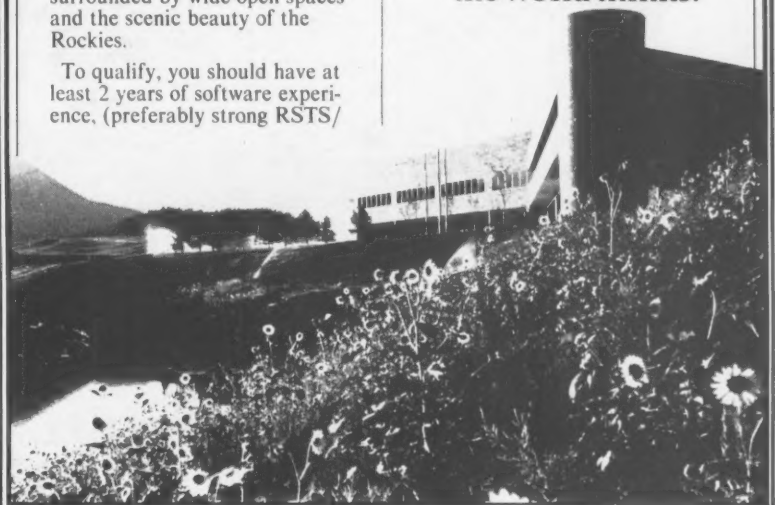
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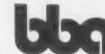
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<p>DEC IMMEDIATELY AVAILABLE</p> <table border="0"> <tr> <th>Communications</th> <th>Disks</th> <th>Tape</th> <th>Options</th> </tr> <tr> <td>OZ11 DU11 DMC11 DL11W</td> <td>RP06 RP04 RP02 RL02 RK07</td> <td>RP06 RP03 RM03 RL01 RK06</td> <td>TWE16 TJU16 TU16 FP11A-C FP780 BATTRE KMC11 KG11A BR11EA M8309</td> </tr> </table> <p>OTHER OPTIONS AVAILABLE CALL FOR QUOTE</p> <p>NATIONAL COMPUTER EXCHANGE</p> <p>6980 ARAGON CIRCLE, SUITE 5 BUENA PARK, CALIFORNIA 90620</p> <p>(714) 522-1870 (800) 854-7224 TWX 910-598-1499</p>	Communications	Disks	Tape	Options	OZ11 DU11 DMC11 DL11W	RP06 RP04 RP02 RL02 RK07	RP06 RP03 RM03 RL01 RK06	TWE16 TJU16 TU16 FP11A-C FP780 BATTRE KMC11 KG11A BR11EA M8309	<p>• FOR SALE • DATA 100 RJE HASP Workstation Emulates IBM, UNIVAC, others: 2 - TCU's 2 - 600 CPM Card Readers 2 - 500 LPM Printers Accessories</p> <p>AVAILABLE NOW Call: Larry Bancroft 1600 Los Gatos Road San Rafael, CA 94911 Telephone (415) 492-5201</p> <p>FINEMAN'S FUND INSURANCE COMPANIES</p>	<p>FOR SALE MICRODATA</p> <p>48 K-BYTES CORE MEMORY 8 OPEN PORTS 800 BPI 9-TRACK DAA TAPE DRIVE 20 MEGABYTES DISC STORAGE (2-2400 RPM MARATHON DISC DRIVE) SINGLE BAY CABINET 98-CHARACTER, 240 LPM DRUM PRINTER</p> <p>Available August 14, 1981 Asking \$20,000</p> <p>Contact: David S. Mathews University of Southern California Los Angeles, California 90007 Phone: (213) 743-2081</p>	<p>For Sale By Owner</p> <p>Burroughs System 1955 524 KB CPU (4) 65 MB Disk 600 LPM Printer 4 TD832 Terminals Under Burroughs Maintenance Contract</p> <p>Contact: Carl Wright 201-795-0629</p>																						
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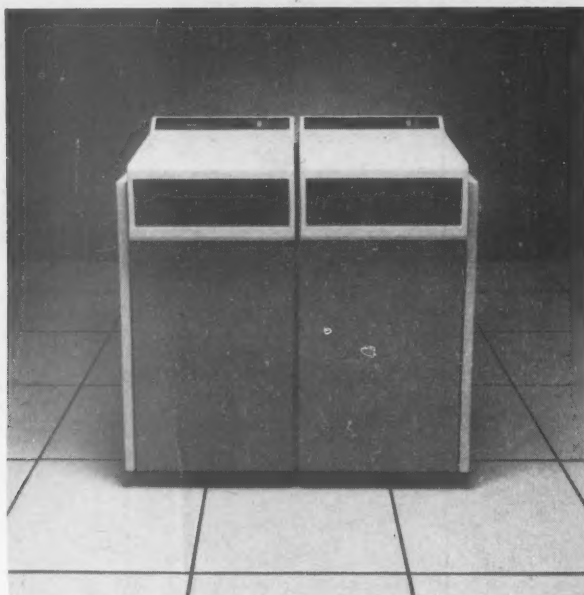
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